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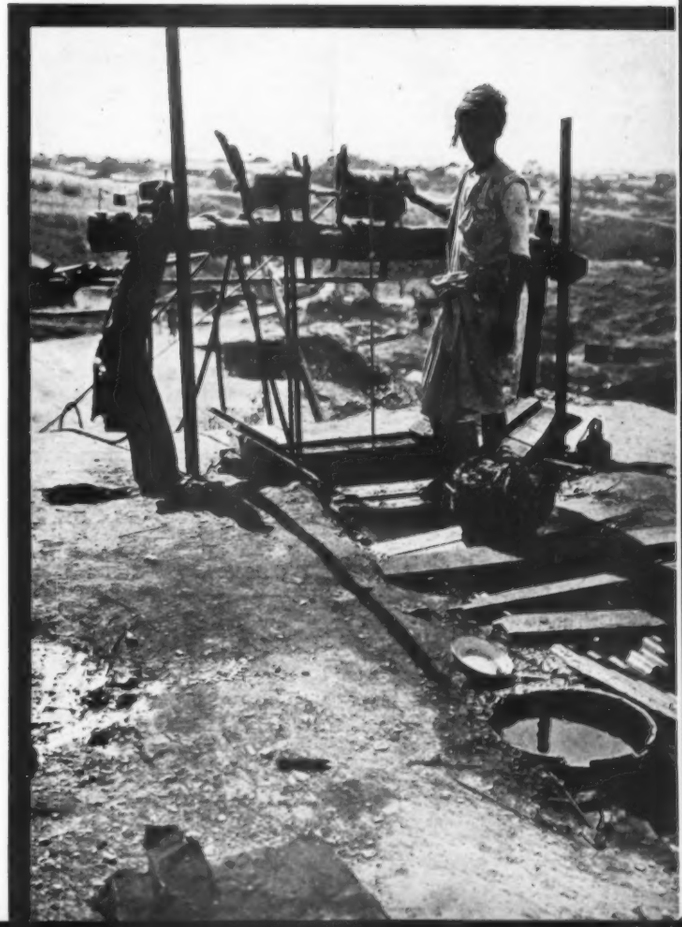
WORLD PETROLEUM

Cooperative Plan For World Oil Industry Through Joint Organization of Leading Producers and Exporters • World's Refineries Illustrated • Anti-Trust Laws and Petroleum Industry • Independents Again Urge U. S. Oil Embargo • New Zealand Oil



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WORLD PETROLEUM

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VOLUME II — NUMBER 10

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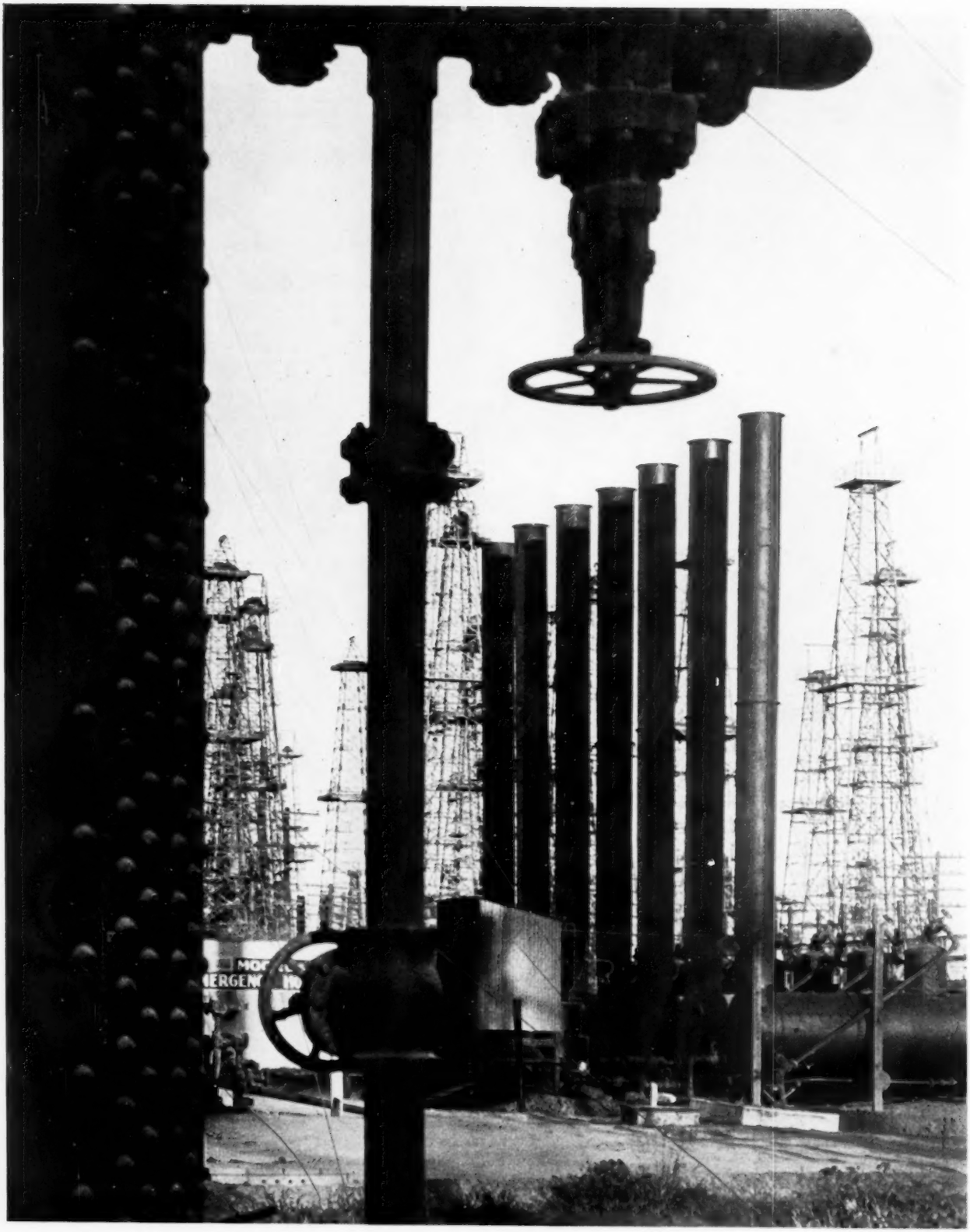

Under production restriction Will Connell

NEW YORK • WORLD • LONDON

PETROLEUM

Oil Markets Interdependent

ONE important factor that sometimes fails to receive its proper evaluation in discussions of the problems of the petroleum industry is the interdependence of oil markets. The use of petroleum products has become world wide and production no longer is limited to any one quarter of the globe nor dominated by any single country. Increased output in any important producing section means lessened imports or expanding exports and consequently affects price levels in all consuming markets.

This point was strikingly developed in the noteworthy article contributed to the September number of WORLD PETROLEUM by J. B. Aug. Kessler, joint-managing-director of the Royal Dutch-Shell group. As Mr. Kessler pointed out an enlarged output in Roumania results in depressing Gulf quotations in the United States because the surplus Roumanian stocks go to markets that otherwise would be supplied by the American product. Similarly the opening of a new pool in Texas is reflected in lower prices, not only in its immediate territory, but on the opposite side of the globe as well, even though none of the new production may enter foreign markets. If we vision the world's oil supply as contained in one huge reservoir it is easy to realize that every addition to the contents of this reservoir, regardless of its source, is bound to result in a lowering of the average price obtainable for the whole supply.

Mr. Kessler pictured very clearly the bearing of this condition upon the great problem of world stabilization. As he exemplified from actual trade experience, efforts by producers in one or another section to establish a policy of conservation have failed to improve values because other fields were producing without restriction, demonstrating that successful stabilization depends upon the cooperation of all important producing territories.

The great industries of the world have passed beyond the point where any one division can live to itself alone. Their problems, though diverse, must be shared together. Prosperity for industry as a whole, as for its various branches, must depend upon harmonious action along the lines of world cooperation. World understanding is an essential preliminary to world cooperation and the reiteration of fundamental facts is justifiable and necessary to a general appreciation of the situation.

For a World Conference

RECOGNIZING an international understanding as the only effective means of bringing about the stabilization of the petroleum industry, the meeting of the Oil States Advisory Committee at Oklahoma City early in September approved a proposal for a world conference of oil interests and sent a special committee to Washington to enlist the aid of the Department of State in bringing about such a meeting at some suitable time in the near future. Unofficially it is indicated that the Federal authorities look with favor upon the suggestion for such a gathering of representatives of the world petroleum industry, but feel that it should be preceded by a more definite arrangement for the regulation of production in the United States. The committee itself has proposed that a plan of proration be adopted which would hold daily world production in 1932 to 4,153,000 bbl. and that for the United States to 2,407,517 bbl. While of course the decision as to total production is a matter for agreement among the various interests concerned, this proposal for a world conference is one that has gained support rapidly since it was first suggested in WORLD PETROLEUM and it is one that Mr. Kessler puts forward in his plan for stabilization. In an era when world economic agreements bid fair to play the important part formerly served by political and military understandings such a meeting would seem to be an essential first step.

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Bearing on Tariff

ALTHOUGH Mr. Kessler's paper did not discuss the subject of tariffs, the foregoing considerations apply to such measures also. Imposition of a tariff on oil imported into the United States which is being urged by a considerable group of domestic producers with the object of establishing better prices in the home market would be unlikely to accomplished its purpose for the reason that the United States is an exporter of petroleum products on balance and the price level is determined by the rate obtainable for the export portion. To the extent that supplies from other producing sections are kept from entering the United States, they will displace the product of American wells in other parts of the world and so intensify internal competition.

Statistics on this point are illuminating. In 1930 the value

of petroleum and petroleum products exported from the United States was $494,000,000 while the total value of imports of these commodities was $145,000,000. In 1931 both imports and exports have fallen off substantially in volume and tremendously in value. For the first six months of the year exports of the principal classifications amounted to $147,544,000 while imports were $52,858,000. The favorable trade balance on the exchange was $349,000,000 for the twelve months of 1930 and nearly $95,000,000 for the first half of 1931.

Exports from the United States, moreover, are mainly in the form of manufactured products. Crude oil constituted only 7.5 percent of the total. An important item not ordinarily included in statistical reports is that of bunkers for foreign bound steamships, which amounted to almost 50,000,000 bbl. in 1930 and to 22,775,000 bbl. in the first half of 1931. On the other hand 87 percent of the petroleum imports into the United States during this same six months period consisted of crude and topped oil, including fuel oil. By placing an embargo on oil imports the United States would sacrifice the wages and other income now derived from the manufacture into finished products of the imported crude which, either directly or by replacement, enters into the export trade of the country. Aside from the loss thus imposed an embargo, and to a less degree a tariff, would interfere with the supply of fuel oil required by the industries of the eastern states for which present refining operations within the country are inadequate, not to mention the lack of sufficient American flag tankers to transport the fuel from California and Gulf ports. Here again, as in the broader aspects of stabilization, cooperation on the part of all interests, rather than independent action by a single one, is the effective method of price improvement.

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Barrier to Cooperation

It is not to be denied that world cooperation faces many difficulties. In oil, as in many other commodities of first-rate importance, such cooperation is impossible without the active support of producers within the United States because of the leading position occupied by this country in all phases of the industry. The one factor most discouraging to progress toward the realization of practical world cooperation is the legal inhibition laid upon American producers against joining in any agreement in restraint of trade. The sweeping language of the Sherman anti-trust law in declaring that "every contract, combination or conspiracy in restraint of trade or commerce is hereby declared illegal" not only contravenes progressive business practice, but, as interpreted by the courts, goes far toward nullifying the primary object of the law which is the maintenance of free competition through the preservation of a large number of independent competitors.

Many of those who are unwilling to take the political risk involved in lifting the declaration against trade agreements have shown a disposition to make an exception of the oil industry, because of the clear evidence that the enforcement of unrestrained competition in oil production involves a tremendous waste of one of the nation's great resources that is impossible of replacement. This sentiment has not yet crystallized into definite action. Until it does such efforts as are made toward the stabilization of oil production and toward prevention of the criminal waste of oil and gas that has been going on at an accelerated pace in recent years must be left to the individual states. It is within the power of a state to enact proration laws, or to adopt other means of regulating production within its own borders, but as soon as the attempt is made by individuals or corporations to apply such an undertaking to petroleum products that move across state borders the authority of the Federal Government intervenes to declare it an act in restraint of trade. Congress may be persuaded to act to permit American oil interests to join an international agreement, but such action cannot be taken for granted.

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Three Key Countries

Not all the obstacles to unity of action in dealing with the problems of the oil industry originate on the western side of the Atlantic. Key territories in the petroleum export situation are the United States, the Caribbean, Russia and Roumania. With the possible exception of Russia all of these must be included in any successful plan for stabilization of the international market. Venezuela, the principal producer of the Caribbean group, offers no difficulties inasmuch as it already is practicing conservation and undoubtedly stands ready to participate in a general movement toward stabilization. While it is impracticable under existing law for the producing interests of the United States to enter into an agreement to limit output the same result may be achieved through legislative action by individual states. The objective seems to be in a fair way of attainment and the movement has the support of the major oil producing interests of the country. In Russia and Roumania, however, there are no indications at this time of an attempt to reduce export shipments. On the contrary production is increasing and systematic efforts are being made to expand the flow of petroleum products to external markets.

Roumanian oil exports rose from 13,500,000 bbl. for the first six months of 1930 to 17,500,00 bbl. for the first six months of the current year. This increase of about 30 percent compares with an enlargement of but 16.5 percent in Roumania's crude oil production during the same period of time. The increase in Roumanian exports in no way compares with the normal rate of increase in consumption of petroleum products in Europe and hence it is evident that Roumanian shipments are displacing the products of other oil exporting countries. A bill now under consideration threatens to aggravate the situation by permitting free exportation of crude which was prohibited by the law of 1929. The expansion of Roumania's exports is not benefitting the country's oil business, but on the contrary is making it unprofitable, while at the same time accentuating the depression in other oil producing countries.

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A Plan for Cooperation

Having pointed out that cooperation is essential to the stabilization of the world oil industry Mr. Kessler now brings forward a definite scheme for co-operative action. His plan appears in detail on other pages of this issue. It encounters some of the difficulties outlined in the preceding paragraphs. It may be impossible of achievement. It does represent, however, the measured thought of one of the chief executives of one of the greatest of international petroleum companies. As such it deserves and doubtless will receive the serious consideration of all those who appreciate the gravity of the situation confronting the petroleum industry and the necessity of finding some effective means of ameliorating existing conditions. WORLD PETROLEUM is gratified to be able to present Mr. Kessler's proposal as a constructive contribution to the solution of the most important problem before oil industrialists today.

Anti-Trust Laws and Petroleum Industry

Federal Agency Needed With Power to Approve or Disapprove in Advance Contracts Falling in Twilight Zone Between Validity and Invalidity.

By Judge C. B. Ames.

Vice-President,
The Texas Company.

THERE is too much criticism of our anti-trust laws. There are even some who believe the present depression might have been avoided but for these laws. It is quite obvious in the petroleum industry, however, that if there were no anti-trust laws, either State or Federal, that the industry itself would not be able to make an agreement to remedy the present situation. That our anti-trust laws have little or nothing to do with the depression is demonstrated by the fact that the depression exists in those countries which have no anti-trust laws, or which encourage agreements to stabilize trade. Broadly speaking, the anti-trust laws are based on the deliberate purpose of the American people (a) to prevent monopoly and (b) to preserve individual freedom of action. Some of their details may be subject to criticism but their fundamental purpose is sound.

Any effort to repeal them is a pure waste of time and energy. The anti-trust laws are with us and with us to stay.

Any effort to procure amendments or alterations in the substance of these laws is likewise doomed to failure.

The only effort which has a fair chance of success is to improve the administrative machinery. Under the existing system of administration we have a series of prohibitions, but not much in the way of constructive permission. Contracts in restraint of trade are prohibited. Whether a contract restrains trade or not depends upon the surrounding circumstances: the nature of the contract, its effect upon the parties, its effect upon competitors, and its effect upon the public. If, in consideration of all these matters, the agreement does not unreasonably or unduly restrain trade, it is not a violation of law. Some agreements are plainly invalid when this test is applied; others are in the twilight zone between validity and invalidity. It is only this third class which presents the need for consideration. Those who enter into contracts which are plainly invalid are not entitled to any relief from existing laws, while those who enter into contracts which are plainly valid need no relief. It is only in the doubtful field that relief should be considered.

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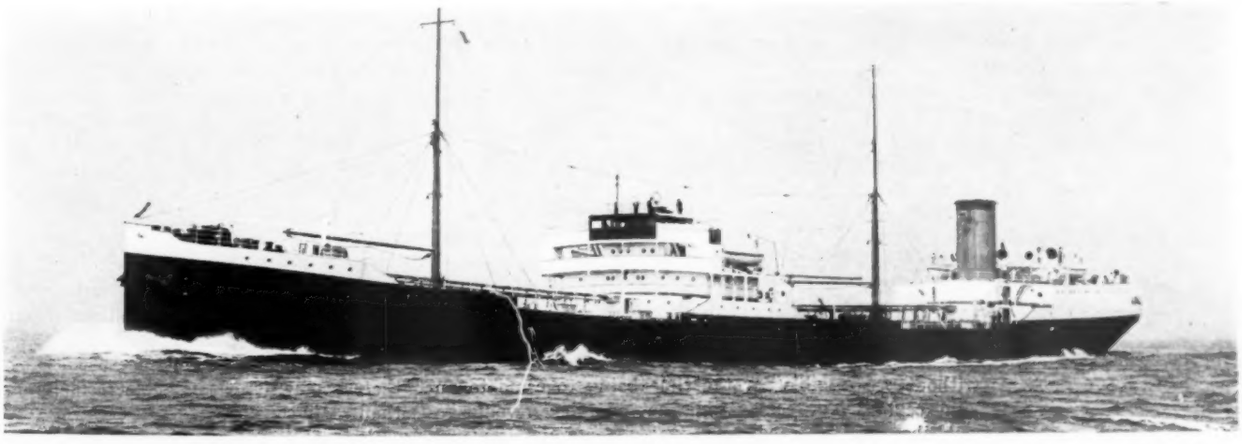
At present, in this field, there is no certain test of validity until after the contract has been challenged by the Government in court and the case has dragged its weary way to the Supreme Court of the United States. Frequently several years elapse before the case is finally decided and then the effect of the decision is usually to hold either that the contract is, and always has been valid, or that the contract is, and always has been invalid. If held invalid, the parties may be subject to triple damages, and conceivably, to criminal prosecution, although this latter contingency is negligible. Administration of the law would be improved if Congress would provide some federal agency with power to approve or disapprove in advance contracts falling within this twilight zone. Such an agency would be a distinct improvement in the administration of the law but would involve little or no change in its substance. If the business sentiment of the country could generally see that this is the only procurable remedy, and that it is likewise a sufficient remedy, it might procure relief, at least to this extent; but with all sorts of conflicting views within industry itself and with all sorts of plans and schemes being presented to Congress, it is hardly likely that industry will be able to procure any relief at all. In other words, unless industry generally knows what it wants and is able to present a definite and a firm request to Congress, it will be impossible for Congress to give industry what it wants or needs.



Transportation forms one of the major operating costs of the international petroleum industry. Many existing tankers are becoming obsolete due to the introduction of higher speed, but more economical, vessels. "Caprella," one of the tankers of the Anglo-Saxon Petroleum Company's new 13½ knot, Diesel-driven, fleet.

Cooperative Plan for World Oil Industry Through Joint Organization of Leading Producers and Exporters

By J. B. Aug. Kessler

IN the September issue of World Petroleum J. B. Aug. Kessler, joint managing director of the Royal Dutch-Shell group, presented the thesis that the problems of the petroleum industry could be solved only through world cooperation. His argument was supported by extensive citations from trade statistics showing the ineffectiveness of efforts at stabilization undertaken by groups of producers acting independently.

In the article published herewith, Mr. Kessler outlines a proposal for making world cooperation a practical reality. His plan is set forth with the completeness of detail of an engineering blue print, a fact that probably is explained by Mr. Kessler's training and experience as an engineer. Unquestionably there are serious difficulties to be overcome in putting into operation a scheme such as Mr. Kessler proposes, but his plan has the merit of being definite, specific and complete. It reveals the advanced position taken by a leader of one of the strongest international petroleum organizations and cannot fail to stimulate thought and discussion on the most important problem confronting the world oil industry.

IF a world conservation agreement could be arrived at under which production would be brought below consumption, so that future reserves could be preserved, and the wastage of gas brought to an end, and stocks gradually worked off, the price level certainly would improve considerably, but as long as drilling is going on on a large scale potential capacity will remain far above world consumption, and therefore any member of a world conservation scheme can bring it to an end at any moment by opening up its wells. At its best a world conservation scheme is an armed truce.

Another practical objection to a simple world conservation scheme without provisions governing drilling and certain other factors is that it would be extremely difficult to negotiate. We may assume that as a result of the low price level most members of the oil industry, if not all, realize that something must be done to improve conditions. Those who understand the reactions of the different parts of the world oil industry one upon another, will realize that only an arrangement on a world-wide scale can be satisfactory. The will, in principle, to come to an agreement may therefore be assumed to be present among the world's producers. When it comes to the practical application of the principle, that is to deciding how much each different member of the world oil industry may produce, then the difficulties arise. With the knowledge that I have of the ideas of some of the members of the world oil industry I consider it practically impossible for the time being to come to an agreement on what everybody would be allowed to produce under a simple world conservation agreement.

The plan that I am now going to outline will avoid the difficulties just described, and will automatically bring prosperity back to the industry.

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THERE are three countries that are of major importance in a world arrangement, namely, the United States, Venezuela and Roumania. First, however, I shall deal with the part that other countries will play in my scheme.

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FIRST of all there is a category of countries the production of which is controlled exclusively or to a very great extent by one or two of the major companies. These countries are Persia, Colombia, Egypt and the Dutch East Indies, including Sarawak. They never have indulged in over-production. The major companies controlling the production in those countries would undertake that during the period covered by the arrangement which I am proposing their countries will continue their present adherence to conservation.

As soon as the arrangement came to an end—for whatever reason this might be—of course the undertakings given for the above-mentioned countries would terminate.

The second category of countries includes those which do not produce as much as their own consumption. Those countries are the Argentine, Japan, France, Canada, Italy, Czechoslovakia, Bolivia, Ecuador, Germany and India. As a local production has the first call on its own local market it is out of the question to ask those countries to conserve their production as long as it is lower than their consumption—in other words, so long as they do not export.

The third category comprises those countries whose production has been falling during the past few years. This

group is made up of Mexico, Poland and Peru. It would be out of place to expect these countries to pledge themselves not to try to increase their production above their present reduced output as compared with what they had a few years ago. Furthermore there does not seem to be any danger that their production will increase considerably for the time being. If my plan is put into operation it is to be expected that conditions in the oil industry will be normal again before there can be any question of these countries producing much more than they do at present.

The production of Trinidad has been practically constant during the past few years. It should be included therefore, in Category 3 or it should join the plan in the same way as the United States, Venezuela and Roumania as described below.

Russia stands by itself. It is uncertain whether its authorities would be willing to come into an international agreement. Under the plan that I am proposing there is hardly room for them. It is not considered necessary that they should come in because of their increasing local consumption and the slight possibility that they will be able to increase their production considerably.

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THERE remain the three countries mentioned above—the United States, Venezuela and Roumania. It will be necessary in working the scheme to deal with some of the major oil producing states of the United States as if they were separate "countries."

In explaining my plan, in order to keep it as simple as possible, I have not applied this subdivision. I have therefore considered the whole of the United States as one country, just as are Venezuela and Roumania.

The oil industry in each of these countries should appoint fully authorized representatives for an international meeting.

There are only two prerequisite conditions for this international meeting.

The first is that the oil industrialists of these three countries must honestly believe that an endeavor should be made to bring world production down to something below world consumption, so that gradually the excessive stocks can be worked off.

The second is that they (each) undertake to get their Governments to prohibit drilling so long as the production of their country is above the figure which is considered by the representatives of that country (and by them alone) as the minimum production to which they are entitled under the world oil conservation scheme.

As an alternative to the prohibition of drilling a tax on drilling of not less than $30. per foot may be considered. An obvious disadvantage of a drilling tax is that it may become permanent which would mean a lasting burden for the oil industry. On the other hand it may be difficult to get Governments to prohibit drilling (under certain conditions) altogether. Both methods have their advantages and disadvantages.

I want to emphasize that each country can fix for itself its minimum production. The lower it is fixed the more easily my plan will work, but if it is not fixed low enough the plan still will be workable. In fact it offers the only prompt way out of the industry's present troubles that I have heard of. In my opinion it is the only plan that will save the industry before there are so many casualties that Governments are bound to interfere (to a far larger extent than by temporarily prohibiting or taxing drilling as long as there is over-production) in order to save the balance of the resources at present endangered by lack of management, vision and foresight in the industry.

Now let us develop the project a step further. The first question at the international meeting will be: How much do the Roumanian representatives consider that their country should produce as a minimum under the world conservation plan? They will have with them the claims of each of the companies working in Roumania, so that they can make their total according to those individual claims. Let us assume—to make my point clear—that they will claim 112,000 bbl. a day.

As to the United States let us suppose that its representatives claim 2,500,000 bbl. a day as their minimum under the world conservation scheme.

As to Venezuela let their assumed figure be 400,000 bbl. a day. Then we get the following calculation:

In order to bring world production somewhat below world consumption, so that stocks can be worked off within a reasonable time, statistics may show that the production of these three countries should not be more than 880,000,000 bbl. per year. This figure can be fixed by statisticians and there need be no bargaining on it. The only point on which we shall have to agree is: "How long shall we take to work off surplus stocks?"

The "declared minimums," as we have seen above, were:

For Roumania . .	112,000 bbl. x 365 =	40,880,000 bbl.
United States . .	2,500,000 bbl. x 365 =	912,500,000 bbl.
Venezuela	400,000 bbl. x 365 =	146,000,000 bbl.
	or a total of	1,099,380,000 bbl.

or, say, in round figures 1,100,000,000 bbl. per annum.

There is, therefore, a "declared overproduction" of 220,000,000 bbl. per annum. This overproduction of 220,000,000 bbl. that the three countries claim is what one might call the "top" of their production, that is to say, that part of their production that costs them least of all. It is, so to say, the production which they can get by opening up their wells just a little bit more. I think I may assume that the average cost of that part of their oil production is not more than 20 cents per bbl. We all know that the return on the products under present conditions is very poor. In calculating the net back on the products contained in this "top" of the crude production the cost of refining need not be charged with any of the overhead expenses of pumping and refining. However low, therefore, the returns are, I think I may assume that the production and selling of the products contained in the "top" of their crude production still leaves the producers a return of, say, 40 cents per bbl. or, in other words, a cash profit of 20 cents per bbl.

In order to induce the producers of the three above-mentioned countries not to produce the 220,000,000 bbl. (which we have found as a "declared yearly overproduction") those producers would have to be offered 20 cents per bbl. as an indemnity for not producing that quantity. The moment, however, that the industry comes together on such a scheme one may assume that prices will improve, and that consequently the calculated profit of 20 cents per bbl. will no longer be enough to induce producers to restrict their output. I assume that my calculated profit of 20 cents per bbl. would increase at once as a result of the world-wide arrangement, to 40 cents per bbl. It would be necessary therefore to offer for each bbl. of the total quantity of 1,100,000,000 bbl. which is not produced a payment of 40 cents per bbl. The "declared yearly over-production" being 220,000,000 bbl., the "declared over-production for a quarter" is 55,000,000 bbl. and that multiplied by 40 cents gives an amount of $22,000,000. That is the amount which must be available before the beginning of the first quarter of the arrangement in order to supply a sufficiently strong financial inducement to bring over-production to an end. This amount is to be found by the oil industry in each of the three countries mentioned

above paying an amount of about eight cents per barrel of its "declared quarterly minimum", (1,100,000,000 x 8c = $\frac{\text{4}}{}$ $22,000,000).

If any of the three countries considers the total sum to be found too great a burden it can reduce the amount by decreasing its "declared minimum production."

The oil industrialists in each of the three countries mentioned undertake to get their respective Governments to prohibit drilling altogether, or alternatively to put a tax of at least $30 on each foot drilled, as soon and as long as the production of that country is above the "declared minimum." Otherwise every country is free to produce whatever it chooses, below or above its "declared minimum." I rely on the prohibition of drilling or alternatively on the tax on drilling to act as a powerful brake for the producers not to go above their "declared minimum," but there need be no undertaking on the part of anybody not to produce more.

The fund accumulated before the first quarter is at the end of that quarter distributed pro rata to those countries which produced less than their "declared minimum" if, during that quarter, total production of the three countries has been less than their "combined declared quarterly minimum." The existence of this fund will work as an inducement for producers to produce less than their "declared minimum" in order to participate in the distribution of the fund at the end of the quarter. It is a practical certainty therefore that the total production of the three countries will be less than their "combined declared quarterly minimum." In other words it is a practical certainty that the first quarter's fund will be divided after the end of the first quarter and consequently that those who cooperated to bring overproduction to an end will get their just reward. Suppose that during the first quarter Venezuela had produced 10,500,000 bbl. below its "declared minimum" and that the United States and Roumania had produced respectively 35,000,000 bbl. and 3,500,000 bbl. below their "declared minimum"—i. e. together 49,000,000 bbl. below the combined "declared minimum." In that case the $22,000,000 would be paid to Venezuela, the United States and Roumania pro rata to the difference between the "declared minimum" and the actual productions in those countries. They each distribute their share on the same basis among their own oil industrialists, who actually applied conservation and who would on an average receive $\frac{\$22,000,000}{49,000,000}$ = 45 cents for each barrel by which their production was below their "declared minimum."

If all the countries produced below their "declared minimum," and if they produced during the first quarter just 220,000,000 bbl. = $\frac{\text{55,000,000 bbl.}}{\text{4}}$ less than their combined "declared minimum," then on an average each of the operators applying conservation would receive out of the fund 40 cents per barrel produced under their "declared minimum," which is just the figure which I calculated was the profit they agreed to forego by producing less than their "declared minimum."

After the first quarter has passed off satisfactorily and the first quarter's "fund" has been distributed among the producers who applied conservation, it is reasonable to assume that as a result of higher market prices for oil we shall have to offer the combined producers of each of the three countries during the second quarter a bigger reward than 40 cents per barrel in order to induce them to remain producers below their "declared minimum." Once prices have improved, however, it will be much simpler for the oil industry in the three countries to find an amount considerably larger than $22,000,000 as payment into the fund for the second quarter. In other words, once the fund has been started satisfactorily, I do not expect any difficulty in its continuation. It might be considered advisable however, to limit the compensation per barrel for producing below the "declared minimum" to not too high a figure.

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I PROPOSE that the plan should be continued for quarterly periods until for a period of six consecutive months the free market price of liquid fuel f. o. b. in the Gulf of Mexico (or such other market as may be considered as most correctly representing the world market price) has been at least $1 per barrel, while during the same period the price of 64 degree Beaume gasoline has been not less than eight cents per gallon. After these prices had existed for at least six consecutive months for both fuel oil and gasoline simultaneously the scheme would be re-introduced as soon as prices declined below those critical levels. As soon as the scheme is called off, the prohibition of drilling, or alternately the tax on drilling, is cancelled.

In order to cure the situation properly it will be necessary to continue the scheme as described in the previous paragraph. An arrangement of this kind, however, can work satisfactorily only if no unforeseen circumstances arise which would make its continuation unfair or impracticable. For instance, it may happen that in one of the three countries concerned a quality of oil is brought in which is unsaleable. For that reason such a field would have to be kept closed in, but because of such involuntary restriction under the scheme the owners might possibly get into a position of participating largely in the distribution of the fund. If this should happen the other members might feel that their interests were damaged so considerably that they might prefer to bring the scheme to an end. For that reason I propose that any of the countries concerned during any particular quarter but not less than one month before the end thereof, may give notice of its intention to withdraw from the scheme at the end of the quarter.

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IT IS reasonable to assume that some of the smaller companies, however anxious they may be to join the scheme, may find it difficult to find before the beginning of the first quarter the amount of eight cents per barrel of their "declared minimum." Very likely some companies are already in the hands of the banks to a great extent, and they might find the banks unwilling to provide the money for their payment into the fund. In order to avoid such difficulties, which would wreck the whole scheme, I suggest that the major companies inside and outside the United States should form an "International Oil Industry Finance Syndicate" which would undertake to finance the payments into the fund of such weaker and smaller companies in case they cannot find accommodation with the banks, on certain "maximum conditions" to be fixed beforehand by the "International Oil Industry Finance Syndicate." The syndicate would undertake to do such financing on those "maximum conditions" against which it would take a first mortgage on the properties of the companies that want such financing. The improvement in the industry that my scheme would effect probably would result in those smaller companies paying off their debt when it fell due after the quarter for which the advance was made, but if by any means they could not pay off the syndicate would foreclose and would sell such properties to the highest bidder.

The total amount that the "International Oil Industry Finance Syndicate"

would have to find would be by no means unreasonably large. As I mentioned above, the total amount to be paid into the Fund for the first quarter might be something like $22,000,000. The major companies, of course, would be able to find their own subscriptions, and I take it that it is not exaggerated—in fact I think it very much under-estimated—to assume that half of that amount will come in without the least difficulty. That leaves still $10,000,000 to be found by getting credit either from the banks or from the "International Oil Industry Finance Syndicate." I think it is conservative to assume that at least $6,000,000 will be found by the banks, which leaves $5,000,000 to be found through the "International Oil Industry Finance Syndicate." Of this Syndicate all the major oil companies of the world would be members, and it is therefore clear that that group of very powerful oil companies would not have the slightest difficulty in finding the finances for an advance of $5,000,000.

I still want to deal with the following possibility: It is conceivable that some insincere industrialist might reason as follows:

"I know that I am able to produce only 300,000 bbl. per annum, but I declare to my national representative that I consider that my minimum production is to be 3,000,000 bbl. I will then pay into the fund 3,000,000 x 8 cents per bbl. = $240,000. I will produce only 300,000 bbl. and I will therefore draw for producing below my 'declared minimum,' 2,700,000 x 40 cents per bbl. = $1,080,000 which will give me a handsome profit of $840,000 for nothing."

Such an insincere industrialist however, would take a tremendous risk, such a risk that I think he never would play such a trick.

As I have described above, the payments out of the fund are not paid to each of the industrialists who produced less than his "declared minimum," but to the combined industrialists of each of the three participating countries that have produced less than their "declared national minimum." Our insincere industrialist may therefore be caught in the following way: Although he had produced 2,700,000 bbl. below his dishonest "declared minimum," the other industrialists in his country may have produced 2,700,000 bbl. more than their "declared minimum" with the result that the total production of the country in which our insincere industrialist works has been up to and possibly even over that country's 'declared minimum." Our friend would find therefore that he would not get any payment out of the fund at the end of the quarter, but that he would have contributed to the fund an amount of 3,000,000 x 8 cents per bbl. = $240,000 which would be a clean loss to him. I therefore take it that we can assume that nobody would dare to declare a minimum which he knew he couldn't produce.

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THERE is another point that requires discussion. Suppose the representatives of Oklahoma, in preparation for the international meeting that would put my scheme into effect, come together. As there are a number of small operators in that state one cannot assume that 100 percent of the Oklahoma producers will be present. Suppose 95 percent are represented and come to the conclusion that their "state minimum" should be 500,000 bbl. per day. But what about the 5 percent that are not present? And what about any new fields that may be discovered during the first quarter's operation of the scheme? The meeting of Oklahoma operators may ignore the 5 percent that are absent, and the not-yet discovered oilfields, and declare as their "state minimum" 500,000 bbl. They will then have to find among themselves for the first quarter's production (91 days) 500,000 x 91 x 8 cents = $3,640,000. Prohibition of drilling, or alternately a drilling tax of at least $30 per foot, is introduced in Oklahoma as soon as the state production is above 500,000 bbls. per day. If the meeting of operators thinks it wise to leave more room for the absent 5 percent and for the new fields that may be discovered, they are perfectly free to fix their minimum at, say 550,000 barrels. In that case the prohibition of drilling, or alternately the tax on drilling, will start only when the production goes above 550,000 barrels, but they will have to find as a participation in the fund 550,000 x 91 x 8 cents = $4,004,000.

The two latter calculations are not absolutely correct because the figure of eight cents per barrel would be affected to a minor extent by the higher minimum declaration of the Oklahoma producers. In order to explain my proposal however, I do not think it is necessary to go into this mathematical detail.

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ALTHOUGH I expect that the application of my plan will cure matters within a reasonably short time, we must consider what would happen if the plan were still working at a moment when, in a country which had not produced oil previously, a major oilfield happened to be brought in, thus placing that country among the world's oil suppliers, say, for example, Iraq. Such an occurrence need not upset the plan at all. Suppose the Iraq pipelines to be built and ready for operation with a capacity of 28,000,000 bbl. per annum. All that has to be done is that the "Iraq oil-industry" shall become a member of the scheme with all its rights and obligations. Its members would pay as their contribution to the fund for a minimum production of 28,000,000 bbl. per annum or so many barrels as they themselves might decide, and they would draw from the fund if their production remained below their "declared minimum." Of course, the smaller their "declared minimum" the easier things would be in general, but just as little as a big "declared minimum production" for the United States, Venezuela and Roumania would upset my scheme, so little would a figure of 28,000,000 bbl. for Iraq upset it. Of course the appearance on the scene of a new producer would affect the contribution per barrel slightly for all the participants, but the change would be small and the scheme would go on working as before.

As the Iraq production would be controlled by a small number of world oil interests, instead of getting the Iraq government to prohibit drilling or alternatively to levy a tax on drilling as soon as production would go above the "declared minimum Iraq production" it might be arranged that the Iraq producers would give a binding undertaking that on no condition would they produce more than their "declared minimum" production so long as the scheme remained in operation.

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TO conclude, in my opinion this scheme requires only:

Firstly, that the international oil industry declare (and mean it) its realization that only an international agreement can put things right, and a desire to co-operate to that effect by trying to bring production down to a figure somewhat below world consumption in order to work off surplus stocks within a reasonable time.

Secondly, that the oil industrialists in the United States, Venezuela and Roumania each appoint fully qualified representatives to talk and act for them along the lines of international co-operation as described in this proposal at an "international oil meeting."

Thirdly, that the oil industrialists in each of those three countries undertake

(Continued on page 586)

New Zealand's Search for Oil

Unexplained Discrepancy Between Geological Reports and Drilling Results Largely Due to Inefficiency. Prospects Excellent for Sales as Well as Production.

By L. B. Inch

Oil flowing from Blenheim No. 2 well. Xmas tree, following second blow-out at 2170 ft. It is rich in paraffin, wax, benzine and kerosene.

OIL boring commenced in Taranaki Province of the Dominion of New Zealand, on the Moturoa field near New Plymouth seaport, in 1866, oil having been seen upon the surface of the harbor in the vicinity of the Sugar Loaves (volcanic plugs) by the Maoris long before European settlement in 1840.

Thousands of pounds sterling have been wasted since then. Although a total of 60,000 bbl. of excellent quality crude oil has been produced, and although a large refinery was erected with a show of great optimism before the War at a premature stage of development, finally to be dismantled and shipped to Persia—the industry has not yet been developed to anything like the stage that geological reports up to the present have indicated. There are oil deposits of excellent quality, but the industry languishes for reasons far from apparent to the casual observer.

Activity continues, nevertheless, and at least thirteen wells have been sunk on the Moturoa field, and seven others in the Taranaki Province, while a number have been sunk upon the opposite (East) coast where conditions are considered to be not so favorable.

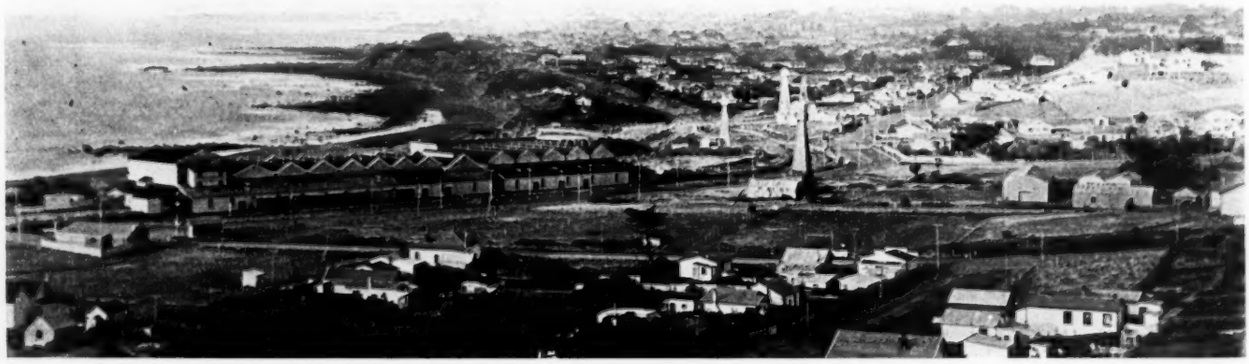
But there is sufficient reason to believe that present companies — with small capital and concerned merely with producing oil—will achieve a measure of success.

There has been lacking the interest that one would expect on the part of the Government, as well as on the part of international petroleum companies. The aloofness is explainable by deducting from a mass of supporting evidence that, while the field is potential, and while concessions and knowledge are kept alive, the time is not opportune to develop, especially considering present world tendencies to over-production, and the main fact that New Zealand imports, mostly from North America, oils and greases valued at £6,000,000 annually, paying 2s/2d, or 52 cents, for gasoline at retail.

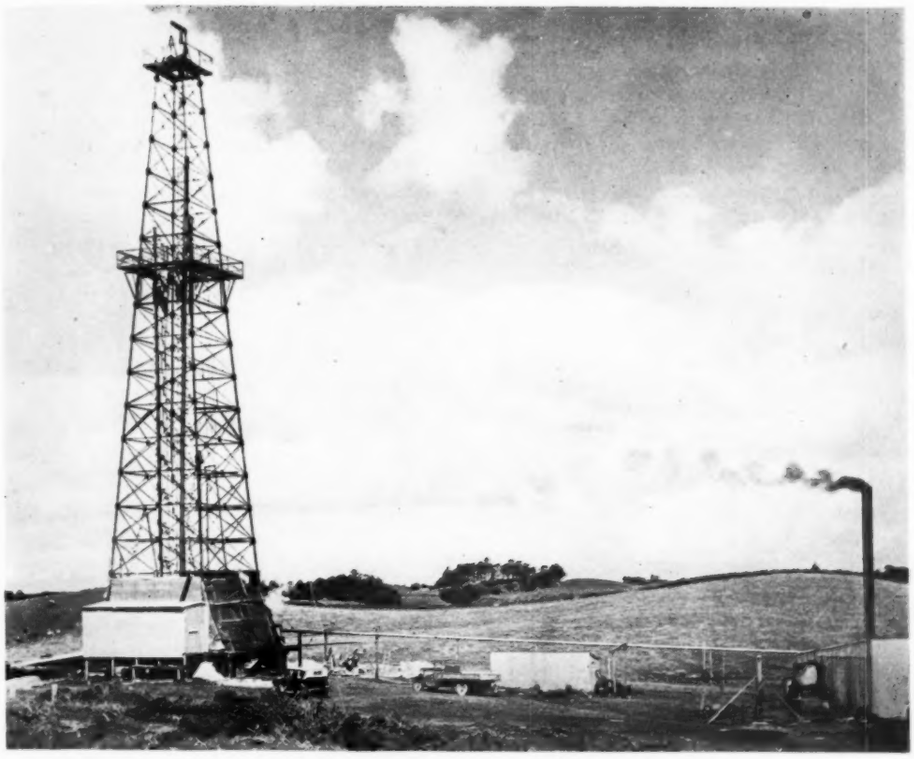
Although nine out of ten wells have reached oil, something has been announced as having gone wrong and wells have closed down with tools lost, water unshut, causing weakness, loss of pressure, or clogging with wax. Many of the abandoned wells flow slightly, or bubble gas of undoubted petroliferous odour.

The facts seem to be that up to six or seven years ago a woeful inefficiency was allied to lack of adequate plant and modern method for, as soon as oil has been struck difficulties have developed. Not until the Blenheim Reclamation Company, Ltd., No. 2 well at Moturoa blew in several months ago, did one well come into production under control; only now has the use of modern methods commenced. In many cases equipment and rig militated against speedy and economical drilling, in others water was not shut off properly, while in every case the pressure was allowed to run wild.

Frederick G. Clapp, a New York petroleum geologist of world-wide experience, expressed his opinion six years ago, in the face of prejudice natural



Old Moturoa oilfield, New Zealand, showing its closeness to the town seen in the background.



Coal oil No. 1, which has reached nearly 3,000 ft. with rotary drilling.

from so many dismal failures, that there was a probability of recovering petroleum on a commercial basis. He gave his reasons as follows: "No wells in the Taranaki field are known to have been systematically pumped; all fell into disuse, or were abandoned, when the flow became so small as to discredit their commercial success. Only one well was drilled properly, so that the others might be considered non-existent as demonstrating whether oil existed in commercial quantity. Although sea-water occured in some wells, much in the sands is fresh and would not interfere with production from wells properly drilled, packed, and cased.

Production Prospects

THE country surrounding Mount Egmont—a perfect cone with ranges extending to the west for seven to ten miles and including the Moturoa area, consists of volcanic debris 300 ft. thick concealing solid Miocene rocks through which volcanic plugs have intruded to such effect that the Miocene rocks are in many instances tilted up against them and so provide structures suitable for the accumulation of oil.

Past records reveal that most wells were sunk into almost horizontal structure where the segregation of oil, gas and water could not have sufficiently taken place. Although top water was rarely shut off from the oil and little or no effort was made to get rid of the paraffin wax choking up the wells, nor to employ strainers for the fine sand which was cutting cups and pumps, some wells produced satisfactorily. Blenheim No. 1 well was said to be good for 100 bbl. a day and another well came in at 35 bbl. per day.

Moturoa oil is valuable, containing as it does up to 20 percent benzine; up to 20 percent paraffin wax; and 40 percent kerosene.

The Moturoa field describes an arc with a radius of about six miles, the center being the deep sea accomodating Port New Plymouth. The Province of which this port-town is capitol boasts the finest roads in the Dominion where road-making is upon a pedestal, New Zealand ranking second only to the United States in regard to the proportion of motor vehicles to the population which is only 1,750,000 settled in a country as large as the British Isles.

Taranaki Province consists of an area equal to a circle described with a 50 mile radius round the concical Mount Egmont. The country slopes gently to sea level from the mountain base and is entirely devoted to dairy farming in holdings averaging from 100 to 500 acres.

The apathy displayed to date in connection with such a promising industry as the oil industry can be imagined from those circumstances. Another very favorable feature being the fact that Australia would afford a wonderful market, and Sydney lies only 1,200 miles due west of Port New Plymouth which is 24 hours steam nearer than any other port in New Zealand.

Past Progress

DURING the past few months, the most promising signs have been manifest following the adherence to modern methods under the guidance of expert drillers, from Mexican, American, Mesopotamian, Persian and other fields, now resident in the district.

A report of the activities to date of the five active companies follows:

The Taranaki Oil Fields, a liability company, sunk a well to 3,000 ft. on the beach near the port with practical result; it went to Tarata 20 miles north-east inland and drilled to 5,010 ft. without practical result so far as is known; then to Okoke, 20 miles north of Moturoa, where the formation pointed to a dome and where conditions were regarded as extremely favorable.

Indeed, the conditions may have been too favorable, for although much money had been spent in transporting the plant, building 20 small bridges, and erecting a rig, operations ceased after drilling a hole only 600 ft. The plant was dismanteled, the shareholders being informed that the rig and equipment (which had drilled 5,000 ft. at Tarata) was not suitable. It is believed that conditions were too promising, and that the knowledge was gained. That was several years ago. Since abandonment,

New Plymouth No. 1. A 10 in. casing was cemented at 2,088 ft. on June 21, 1931. Coal Oil No. 1 well, rotary drilled, can be seen in distance.

the concessions expired; but — very significantly have since been renewed. This company has now transferred operations to the opposite (East) coast in Poverty Bay, 300 miles away. A number of wells had already been sunk in that country, but always fruitlessly the hindrance being that abomination—shifting sand.

Recently the company abandoned one well and is now endeavoring to cement with good showings and prospects of being able for the first time in East coast history to overcome the shifting sand curse.

Blenheim Oil Well Reclamation Company, Ltd. (£20,000) has drilled Blenheim No. 2 well, which is only 66 ft. distant from the No. 1 well drilled to 5,000 ft. and still bubbling gas, as it has done for 15 years since drilling ceased. No. 1 produced 3,000 bbl. from two horizons (2,170 and about 2,210 ft.). No further flow followed drilling past the last named horizon. The No. 2 well is on the same acre section at Moturoa. It has had the advantage of the No. 1 well's log and, after much misfortune and successful sidetracking and shutting off, struck the first horizon with a terrific gas pressure. It blew wild with mud and oil, caving in the bottom.

Further drilling and casing a little distance was followed by a blow out again on April 20 last, under perfect control. This was the first time a well had blown in under control, and intermittent swabbing and self flow for the first 11 days averaged 33 bbl. daily.

Swabbing alone was used pending the arrival of an Australian syndicate purposing to acquire the Blenheim rights and concessions, and form a series of companies producing and refining with capitalization of £2,000,000. The first option was not exercised and, pending completion of negotiations, the company is perfecting a pump system with the idea of maintaining a production of 20 to 30 bbl. daily. It has secured over 357 bbl. from No. 2 well although shut down for over a month. It is proposed to erect a small "topping" plant to separate a second grade benzine and crude oil. The latest opinion is that this is good for at least six months' production before drilling to the second horizon is commenced. In view of the many wells sunk in the vicinity the pressure of 300 lbs. at the "Christmas-tree" on the outer casing is regarded as very significant, especially since that pressure has persisted, in face of the con stant bubbling for 15 years of the No. 1 well only 66 ft. off.

Coal Oil (N. Z.), Ltd. (£750,000 Melbourne, Aus.) commenced over 18 months ago at Omata four miles from the port in country not tried previously. The site was selected by the Elbof geophysical methods, and a great deal of optimism was displayed at the official Ministerial opening. A rotary rig and plant is in use; but bad luck has dogged the American drillers. The plant is regarded as unsuitable for the alternating boulder, mudstone, sandstone and clay in this country. Percussion is regarded as the best system. The No. 1 well is down about 3,000 ft., but has had many days idleness owing to lost tools, broken bits and so on. It has overcome all obstacles by successful side tracking, and has had several showings lately. It is at present cementing and results are expected at any time. It has worked three shifts

Over 20,000 gal. of oil has been produced from Blenheim No. 2, which averaged 33 bbl. daily for its first 11 days.

and money must now be running low, hundreds of pounds having been paid for fruitless surveys.

Moturoa Oilfields, Ltd. (£100,000) commenced near the base of Paritutu a 500 ft. volcanic plug. It struck oil in two horizons sealed the No. 1, which is considered capable of producing well over 10 bbl. daily with pumping, and is now down over 2,000 ft. with its second well with gas showings. It is proposed to drill a number of wells and pump. This company has drilled efficiently, speedily, and economically.

The youngest company, New Plymouth (N. Z.) Oil Wells, Ltd. (£100,000 Sydney, Aus.) commenced on December 10 last, and working only one shift is down 2,288 ft. Gas showings have persisted since 960 ft. increasing with a distinct petroliferous smell, and for the last several hundred feet good showings of oil have been a feature. The water has been shut off successfully and a blow-out is expected at any time. This well also is near the base of the volcanic plug and it is justly considered that it is over the best pool of any to date, with a dome like structure. This well's chances are regarded as extremely favorable. The hole has been drilled perfectly without difficulty or delay.

The Moturoa field proper lies between the town and the port, and the distance along the sea front is residential. In that area all the wells of the past have been drilled, but the Mine Regulations provide that no well shall be sunk less than 198 ft. from any boundary and that no wells shall be less than 396 ft. apart. The Blenheim company secured dispensation, but no other companies could do so now. Most of the land in the vicinity is subject to oil rights, but big concessions in promising country are still procurable.

The land system is freehold in fee simple, titles being guaranteed by the State. The basis of most concessions is five percent royalty with a proviso for drilling within two years, small payments of cash being made as the initial consideration for the granting of the easement.

It is the opinion of competent authori ties that oil can be produced in commercial quantities by efficient methods; indeed, it should be won very quickly, produced and refined if determined enterprise converted the field from a playground for wild-cat manipulators into a genuinely industrial field.

The nucleus of future activity in the form of an "Anglo-Persian Oil Company, Ltd.," is registered at Wellington, Dominion's capital city, with preliminary share capital amounting to but a few hundreds. It is the relic of an attempt, on the part of Anglo Persian interests, to persuade the Government during the War to grant national concessions amounting to a monopoly. The land system of New Zealand rendered such action impracticable.

Production in New Zealand, backed by substantial capital, would unquestionably find a profitable market; especially if wisely handled.

Australia's Tariff Difficulties Settled

Changes in Tariff on Crude Oil and Once-Run Distillate Tend to Encourage Domestic Refining, and Will Result in Early Construction of Several New Plants.

AUSTRALIA'S protectionist policy has been emphasised in the recent action of the Commonwealth Government with regard to revising the import duties on petroleum and its products. Both the desire to protect domestic refining and to raise additional revenue for the depleted treasury probably contributed to the modifications that have been made.

Because of the favorable attitude of the Government toward local industry and in view of the economic depression through which Australia is passing, certain of the other large importers and marketers of petroleum products began to give serious consideration to erecting refineries in Australia.

From May 28 to June 3, the Australia Tariff Board held an inquiry into the the various factors surrounding the importation of raw and finished petroleum products, in order to draft a law that would prove satisfactory to the Commonwealth Government, and prove workable to those companies desiring to establish local refineries. It was debated whether or not there should be a more favorable excise tariff covering local cracking plants, in view of the high cost of installation as compared with local skimming plants; but it was decided that the same protection should be afforded both.

There was also raised for discussion the question of whether gasoline manufactured locally, or imported, for the purpose of blending with Australian manufactured power alcohol, should not receive some preference over gasoline imported or manufactured to be used unblended. Here again, in spite of the fact this would have given further impetus to the use of Australian power alcohol, it was deemed inadvisable to do so. A result of the inquiry was the appearance of a new duty schedule, which has passed the lower house and is now considered to be in effect. One important result of the new schedule is that it is now considered feasible to erect a sizable modern refinery in Australia.

New Australian Tariff Schedules

Crude petroleum imported for use as a fuel with a gasoline content not exceeding 15%	Duty Free
Crude petroleum, whether virgin or enriched with a distillate when imported for local refining is duty free when having a gasoline content not exceeding 70% —but such will bear duty of	2d. per Imp. gal.
on the whole gasoline content if it exceeds 70%	
Once run distillate is dutiable now at	2d. per Imp. gal.
when used for local refining, but when not used for this purpose it bears a duty of	7d. per Imp. gal.
Imported gasoline still bears the duty of	7d. per Imp. gal.
while the excise tax on locally refined gasoline remains at	4d. per Imp. gal.

The new refinery when constructed may include both cracking plant and a skimming plant. It is, therefore, probable that at least one of the major oil companies operating in Australia, and possibly several others, will, within a reasonable time, construct up-to-date plants.

For a number of years there was no import duty on crude petroleum, but there was a duty of 1d. per Imperial gallon on imported gasoline, with no excise tax on locally manufactured gasoline. Then a program of road building was inaugurated and funds had to be secured for the purpose of paying for new roads. for this purpose, while crude petroleum still remained duty free, an additional duty of 2d. was levied on imported gasoline, making a total of 3d, or six cents, per Imperial gallon was levied on locally produced gasoline.

In 1929 the import duty on imported gasoline was raised to 4d. per Imperial gallon, while the excise tax on the local product was increased to 3d. Then with the need of further financial assistance the import duty on gasoline was raised to 7d. and the excise tax increased to 4d. with crude petroleum still duty free.

For many years there have been two small refineries in Australia, producing gasoline. The one is located at Laverton, a suburb of Melbourne and belongs to the Commonwealth Oil Refineries, Ltd., in which the Commonwealth Government has more than a half interest, the balance being owned by the Anglo Persian Oil Company. The other is located at Clyde in New South Wales, just outside of Sydney, and now belongs to the Shell Oil Company, Ltd. of Australia, who purchased it from John Fell, a few years ago. With the waning of Government resources, the question of crude petroleum itself—even for local refining—was brought up for consideration as a possible source of revenue, particularly as it was known that certain shipments received by the C.O.R. were enriched with a once-run distillate, which is really an unfinished gasoline, and should properly bear import duty. In March of 1931 certain tariff amendment proposals were advanced to permit the free entry of crude petroleum—having a gasoline content of 35 percent, or less; but, imposing higher duties when the content was more than 35 percent. and likewise imposing certain duties on once-run distillates (4½d. per Imperial gallon with a gasoline content of 70 percent or less, and 7d. when exceeding 70 percent.)

If this materializes it should be of real assistance to the economic life of Australia, where the depression has been more severe, perhaps, than in any other part of the world. Australia's salvation today rests in the fact that it realizes its precarious position and as a result is reorganizing its house in an endeavor to reduce and carefully budget expenditures; curtail superfluous imports; maintain or possibly increase its exports, and enlarge local industries. The idea, therefore, of establishing local refineries in Australia fits in very well with the Government's policy, and while crude oil will have to be imported, a great volume of the gasoline imports can be eliminated and local materials and local labor employed.

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URUGUAY will purchase 168.000 bbl. of Russian gasoline, open a local buying credit of $1,000,000, and spend $75,000 on storage tanks and tanker unloading lines if the recommendation of the industries committee of the National Administrative Council is adopted by the Uruguay Government.

Canada—America's $50,000,000 Oil Market

Total 1930 Imports, Mostly from the United States, Valued at $66,619,649 Compared with Oil Products Totalling $2,441,632 Exported. Dominion Government Figures Just Issued.

ONE of the most complete and comprehensive reports of a nation's petroleum industry ever compiled has just been issued by the Canadian Dominion Bureau of Statistics. Space limitations prevent its publication in entirety in WORLD PETROLEUM; but the figures we give are sufficient to indicate adequately the growing importance of the oil business in the Dominion. Canada forms, and is likely to continue being, one of the greatest export markets for the United States, exceeding $50,000,000 annually; although recent depressed prices doubtless will make a big cut into values for the current year.

Imports of crude oil into Canada from the United States during 1930 totalled 19,796,999 bbl. In the report issued by the Bureau detailed comparison figures are made for the five-year period of 1926 to 1930, and consequently make a vivid picture of the petroleum industry in that country.

Canada's domestic refining business is steadily expanding and last year the output of petroleum products nearly reached one hundred million dollars,—$91,787,-205 to be exact.

This production was the second highest ever reported for the industry, being only eight percent under the record of $99,408,314 in the previous year, but 11 percent over the total of $83,122,172 reported for 1928, the third best year. These totals include data on the refining of crude oil and the compounding of lubricating oil and greases, and the report as issued also gives detailed information for each of these groups separately.

In 1930 there were 15 petroleum refineries operating at strategic points across Canada. These plants used 1,064,-434,974 Imperial gallons, or approximately 30,412,477 bbl. U. S. of crude oil in 1930, including 692,894,949 gallons from United States, 320,-017,161 gallons from South America, and 51,522,863 from Canadian wells. Only one refinery in Alberta operated entirely on Canadian crude; but the three others in that province and two of the Ontario plants used some Canadian oil while obtaining the bulk of their supply from United States fields. The other two Ontario refineries, the Manitoba works, one of the Quebec plants, and one of the British Columbia plants used only United States crude, and the remaining refineries obtained supplies from South America and United States.

Gasoline production totalled 445,599,-417 Imperial gallons, including 169,314,-761 gal. made by the cracking process. Final sales of fuel and gas oils from the refineries amounted to 375,255,886 gal. and in addition to this the operating companies used 59,308,393 gal. for fuel purposes. Other sales included 43,500,-000 gal. of kerosene, 37,500,000 gal. of asphalt, 18,020,000 gal. of lubricating oils, 1,350,000 lb. of lubricating grease, 7,000,000 gal. of solvent naphtha, and over 10,000,000 lb. of paraffin wax and candles.

Considerable quantities of casinghead gasoline were imported into Canada during the year for use in blending with refinery gasoline; the amounts are separately shown in the import figures, but are NOT included with the figures of refinery output.

Petroleum Refineries, 1930

Name	Location of Plant
Imperial Oil Refineries Ltd.	Imperoyal, N. S.
Imperial Oil Refineries Ltd.	Montreal, P. Q.
Frontenac Oil Refineries Ltd.	Montreal, P. Q.
Brit. Am. Oil Refineries, Ltd., The	Toronto, Ont.
Canadian Oil Refineries Ltd.	Petrolia, Ont.
Imperial Oil Refineries, Ltd.	Sarnia, Ont.
McColl Bros. Ltd.	Toronto, Ont.
North Star Oil Ltd.	St. Boniface, Man.
Imperial Oil Refineries Ltd.	Regina, Sask.
Associated Refineries Ltd.	Wainwright, Alberta
Imperial Oil Refineries Ltd.	Calgary, Alberta
The Maple Leaf Oil Ref. Co. Ltd.	Coutts, Alberta
Regal Oil Refining Co. Ltd.	Calgary, Alberta
Imperial Oil Refineries Ltd.	Calgary, Alberta
The Maple Leaf Oil Ref. Co. Ltd.	Coutts, Albert
Regal Oil Refining Co. Ltd.	Calgary, Alberta
Imperial Oil Refineries Ltd.	Ioco, B. C.
Vancouver Oil Co. Ltd.	N. Vancouver, B. C.

(b) Lubricating Oils and Grease Plants, 1930

Jaffe Company, Ltd., The	Montreal, P. Q.
Three-in-One Oil Company	Ville St. Pierre, P. Q.
Economic Products Ltd.	Outremont, P. Q.
Union Products	Montreal, P. Q.
Ontario Lubricating Co. Ltd., The	Hamilton, Ont.
Galena Signal Oil Co. of Canada, Ltd.	Toronto, Ont.
Peterson Core Oil & Mfg. Co. of Can., Ltd.	Hamilton, O.
Campbell Grease & Oil Co.	Toronto, Ont.
McManus & Howard, Ltd.	Winnipeg, Man.
Price Oil Develop. & Ref. Co.	Moose Jaw, Sask.
Price Oil Develop. & Ref. Co.	Edmonton, Alberta
Price Oil Develop. & Ref. Co.	Vancouver, B. C.
Union Oil Co. of Canada, Ltd.	Port Moody, B. C.

Fuel and Electricity Used in the Petroleum Refining Industry in Canada—1930

Kind	Unit of Measure	Quantity	Cost at works (Dollars)
Bituminous coal:			
Canadian	short ton	1,277	7,627
Imported	short ton	57,758	251,983
Coke	short ton	23,538	124,363
Fuel oil	Imp. gal.	59,264,503	2,085,205
Gas:			
Manufactured	M. cu. ft.	3,531,997	875,168
Natural	M. cu. ft.	1,285,750	123,330
Other fuel		.....	97,218
Elec. purchased	K. W. H.	33,491,081	294,789
Total			3,859,683

Principal Statistics of the Petroleum Products Industry in Canada—1929-1930

Year	No. of plants	Capital employed	Average Number of employees	Salaries and wages	Cost of materials at works	Selling value of products at works
		PETROLEUM REFINING				
		(Dollars)		(Dollars)	(Dollars)	(Dollars)
1929	15	69,687,267	4,883	7,984,786	76,289,182	98,384,180
1930	15	69,077,982	5,030	8,003,357	71,307,879	90,809,711
		LUBRICATING OILS AND GREASES				
1929	10	1,373,192	95	168,839	572,757	1,024,134
1930	13	1,256,399	104	186,773	492,550	977,494
		TOTAL				
1929	25	71,260,459	4,978	8,153,625	76,861,939	99,408,314
1930	28	70,334,381	5,134	8,190,130	71,800,429	91,787,205

Imports Into Canada, and Exports of Petroleum, Asphalt, and Their Products—1930

	Unit of Measure	Quantity	Value (Dollars)
IMPORTS			
Asphalt and Its Products			
Asphaltum or asphalt, solid	cwt.	855,834	650,837
Asphalt, not solid		.....	98,458
Asphaltum oil for paving purposes		.....	70,130
CRUDE PETROLEUM, FUEL AND GAS OILS			
Crude petroleum in the natural state, 0.7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to their own factories	gal.	1,012,029,544	38,241,270
Crude petroleum, gas oils other than naptha, benzine and gasoline lighter than 0.8235 but not less than 0.775 specific gravity at 60 degrees	gal.	539,045	58,593
Petroleum not including crude petroleum imported to be refined or illuminating or lubricating oils; 0.8235	gal.	65,733,147	2,406,223
Petroleum, and other oils imported by miners or mining companies or concerns, for use in the concentration of ores of metals in their own concentrating establishments	gal.	134,001	55,242
Petroleum, crude, not in its natural state, 0.725 specific gravity or heavier, but not heavier than 0.770 specific gravity, at 60 degrees temperature when imported by oil refiners to be refined in their own factories	gal.	8,466,369	600,899
Fuel oil, ex-warehoused for ships' stores	gal.	31,560,548	821,313
KEROSENE AND ILLUMINATING GAS			
Coal oil and kerosene, distilled, purified or refined, n.o.p.	gal.	4,911,647	360,518
Illuminating oils, composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon	gal.	10,687	4,660
Coal oil and kerosene, distilled, known as "engine distillate" when 0.725 specific gravity, and heavier, but not heavier than 0.770 specific gravity at 60 degrees temperature	gal.	64,757	9,856
LUBRICATING OILS			
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon	gal.	8,048,755	1,477,639
Lubricating oils, n.o.p.	gal.	8,261,051	3,540,113
GASOLINE AND OTHER OILS			
Gasoline, under 0.725 specific gravity at 60 degrees temperature	gal.	93,822,017	9,488,190
Gasoline 0.725 specific gravity and heavier, but not heavier than 0.770 specific gravity at 60 degrees temperature	gal.	49,953,335	5,712,502
Gasoline, natural casinghead, compression or absorption, lighter than 0.6690 specific gravity at 60 degrees temperature, when imported by distillers of petroleum for blending with other gasolines distilled in Canada (From Sept. 17, 1930)	gal.	9,140,726	784,525
Gasoline, n.o.p.	gal.	10,530,470	1,129,284
All other oils, n.o.p.	gal.	308,019	131,324
OTHER PRODUCTS OF PETROLEUM			
Grease, axle	lb.	5,341,098	288,994
Paraffin wax	lb.	3,464,085	126,770
Paraffin wax candles	lb.	383,063	79,766
Vaseline, and all similar preparations of petroleum for toilet, medicinal and other purposes		.....	25,800
Petroleum, products of, n.o.p.	gal.	1,667,160	251,743
TOTAL		.....	66,619,649

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Experimental bituminous sand plant on the Clearwater river, near Waterways, Alberta, operated by the Canadian Government. *See September, 1930, issue.*

Materials Used in the Petroleum Refining Industry in Canada—1930

Materials	Unit of Measure	Quantity	Cost at Works (Dollars)
Petroleum refining:			
Crude oil from Canadian wells (x)	Imp. gal.	51,522,864	5,410,237
Crude oil, imp.	Imp. gal.	1,012,912,110	62,230,738
Imported fuel and gas oils for use in cracking process	Imp. gal.	.....	.....
Sulphuric acid (66 deg. Be)	lb.	49,250,621	447,382
Sulphur	lb.	901,759	37,959
Caustic soda	lb.	5,801,722	201,420
Soda ash	lb.	352,841	8,285
Litharge	lb.	498,055	41,696
Fullers' earth	lb.	20,102,387	241,793
Compounding materials	..	.....	521,900
Other materials	..	.....	154,462
Shipping containers	..	.....	2,011,927
Total			71,307,879
Fuel and gas oils made and used in pressure cracking process, Imp. gal.		351,436,512	389,719,223

(x) Includes naphtha from the Turner Valley fields.

Output of the Petroleum Refining Industry in Canada—1930

Products	Unit of Measure	Quantity	Selling value at works (Dollars)
Petroleum Refining— Made for sale			
Gasoline:			
(a) straight run	Imp. gal.	276,238,369	37,337,958
(b) by cracking process	Imp. gal.	169,314,761	23,445,341
Fuel and gas oils	Imp. gal.	375,255,886	14,231,129
V.M.&P. or solvent naphtha	Imp. gal.	7,150,672	870,037
Kerosene	Imp. gal.	43,509,487	5,378,830
Lubricating oils	Imp. gal.	18,042,269	2,909,506
Grease	lb.	13,465,366	268,453
Tar	lb.	1,017,500	8,140
Asphalt	Imp. gal.	37,470,666	1,991,629
Petroleum coke	ton	68,549	392,945
Wax and candles	lb.	10,153,924	453,591
Other products		.....	241,053
Total for sale			87,528,612
Petroleum Refining— Made for own use			
Gasoline, straight run	Imp. gal.	46,287	6,273
Fuel and gas oils (except for cracking)	Imp. gal.	59,308,393	2,197,389
V.M.&P. or solvent naphtha	Imp. gal.	14,288	1,690
Kerosene	Imp. gal.	97,394	13,022
Lubricating oils	Imp. gal.	42,621	6,384
Petroleum coke	ton	23,538	124,363
Still gas	M. cu. ft.	3,529,319	874,151
Acid sludge		.....	.....
Other products		.....	57,827
Total for own use			3,281,099
Total Petroleum Refining			90,809,711
Fuel and gas oils made and used in pressure or cracking process, Imp. gal.			389,719,223

Production of Gasoline in Canada, by Processes—1926-1930

Year	Straight run (Gallons)	By cracking (Gallons)	TOTAL (Gallons)	Percentage of total made by cracking
1926	152,307,473	69,839,231	222,146,704	31
1927	184,818,378	73,731,346	258,549,724	29
1928	226,954,319	117,175,542	344,129,861	34
1929	303,973,918	132,646,696	436,620,614	30
1930	276,284,656	169,314,761	445,599,417	38

Petroleum Exports from Canada

	Unit of Measure	Quantity	Value (Dollars)
Oil, petroleum, crude	gal.	19,259,585	881,452
Oil, coal and kerosene, refined	gal.	1,460,676	138,455
Oil, gasoline and naphtha	gal.	7,256,557	1,226,561
Oil, mineral, n.o.p.	gal.	315,779	120,231
Wax, mineral	cwt.	16,958	74,933
TOTAL		.....	2,441,632

Production, Imports, Exports and Apparent Consumption of Certain Petroleum Products in Canada—1929-1930*

FUEL AND GAS OILS—

Year	Production (Imp. Gal.)	Imports (Imp. Gal.)	Exports (Imp. Gal.)	Re-exports (Imp. Gal.)	Apparent Consumption (Imp. Gal.)
1929	448,699,760	95,749,518	28,177,495	.....	516,271,783
1930	434,564,279	97,832,740	19,259,585	.....	513,137,434

GASOLINE—

Year	Production (Imp. Gal.)	Imports (Imp. Gal.)	Exports (Imp. Gal.)	Re-exports (Imp. Gal.)	Apparent Consumption (Imp. Gal.)
1929	436,620,614	175,151,570	4,669,078	168,438	606,934,668
1930	445,599,417	163,446,548	7,256,557	52,752	601,736,656

LUBRICATING OILS—

Year	Production (Imp. Gal.)	Imports (Imp. Gal.)	Exports (Imp. Gal.)	Re-exports (Imp. Gal.)	Apparent Consumption (Imp. Gal.)
1929	24,447,243	17,404,194	.....	.....	41,851,437
1930	19,767,124	16,309,806	.....	.....	36,076,930

KEROSENE—

Year	Production (Imp. Gal.)	Imports (Imp. Gal.)	Exports (Imp. Gal.)	Re-exports (Imp. Gal.)	Apparent Consumption (Imp. Gal.)
1929	49,362,381	4,523,347	1,367,241	1,578	52,516,909
1930	43,606,881	4,976,404	1,460,676	3,262	47,119,347

*No allowance made for increases or decreases of stocks in storage at the refineries.

Consumption of Gasoline in Canada—1930†

Province	1930 By motor vehicles	1930 Total for all uses
Prince Edward Island	2,567,328	2,889,288
Nova Scotia	17,518,709	19,367,349
New Brunswick	13,982,400	15,043,515
Quebec	83,231,068	88,681,459
Ontario	239,058,108	305,829,114
Manitoba	21,627,672	33,468,467
Saskatchewan	51,285,207	76,630,024
Alberta	35,789,985	50,744,600
British Columbia	34,530,673	37,865,180
CANADA	499,591,150	630,518,996
CANADA	499,591,150	630,518,996

†The above figures have been computed from data given in the reports of the provincial governments, which show the total and net revenue received from gasoline taxes. The tax is collected on all gasoline sold and a rebate is given on purchases of gasoline for use in farm tractors, etc.

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Shipping the product of Canadian Government's experimental bituminous sand plant. It has possibilities of yielding 40 percent gasoline when cracked.

Consumption of Crude Oil in Petroleum Refineries in Canada—1921 to 1930

Year	Imp. gal.
1921	373,469,418
1922	394,139,055
1923	408,810,739
1924	467,144,634
1925	445,115,694
1926	585,466,329
1927	716,369,890
1928	849,933,770
1929	1,072,828,496
1930	1,064,434,974

▼

BERNARD DAY, consulting engineer of the Nordon Corporation, a Canadian oil producing company, is of the opinion that the Kelvin-Sunburst field, almost due south of Lethbridge and near the Montana border, will ultimately prove to be of the Texas gusher type. The Nordon concern has been core drilling and testing there for five years.

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Petroleum in the United States and Its Possessions, by Ralph Arnold and William J. Kemnitzer (Harper Brothers, publisher, $16). This authoritative work covers in a comprehensive manner the geology, technology, and economics of the petroleum industry in the United States from its origin to the present time. It consists of over a thousand pages and contains carefully compiled statistics of all phases of the industry.

Both authors are well qualified by experience to undertake the production of one of the most comprehensive statements dealing with the history, development and future possibilities of the industry, ever published. Mr. Arnold is an internationally known consulting geologist, and Mr. Kemnitzer is a well known petroleum technologist and economist. The present book is the result of four years private research on the part of the two authors.

Petroleum in the United States and Its Possessions may be obtained through the offices of WORLD PETROLEUM at the published price.

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A PROFUSELY illustrated, 56-page catalog covering installations and general design of Foster Wheeler complete distillation units has just been issued by that company.

The catalog is divided into four sections: the first, a pictorial presentation of Foster Wheeler installations abroad; the second, methods of handling American crudes; the third, illustrations of details of Foster Wheeler units; and the fourth, gasoline absorption and rectifying plants.

N. P. A. Discusses Industry's Difficulties

Henry L. Doherty Delivers One of His Characteristic Scoldings to Oil Men at Atlantic City Meeting. Overseas Refinery Expansion Changing World Marketing Situation

SEVERAL hundred well known oil men, mostly from the marketing branch of the industry gathered at Atlantic City, September 16 to 18, to attend the 29th annual meeting of the National Petroleum Association. A number of papers were read as follows:

"Economic Law In The Petroleum Industry"
Joseph E. Pogue, Consulting Engineer

"Refineries Outside Of The United States"
C. J. Bauer, Standard Oil Company of New Jersey

"Something Appropriate—Depending Upon The Condition of the Industry At The Day. Hour and Minute Of My Remarks"
Henry L. Doherty, President, Henry L. Doherty & Co.

"Anti-Trust Laws And American Business"
James A. Emery, General Counsel, National Association of Manufacturers

"Russia"
Col. George A. Burrell, Burrell-Mase Engineering Company

"Recent Developments In Refining"
D. G. Brandt, Crew Levick Company

"Domestic Consumption Of Lubricating Oils"
John D. Gill, Atlantic Refining Company

"Coking Outside The Cracking Zone—Higher Gasoline Yield, Higher Anti-Knock"
Alfred Fisher, Universal Oil Products Company

HENRY L. DOHERTY remarked that he was asked to say what he thought about the oil industry. Quoting General Sherman who said "War is Hell," he remarked that the oil industry for the last ten years has been "Hell plus". Men of the oil industry are entitled to congratulations too great to be expressed in words because the public believes that the oil business was carried along with the general demoralization, whereas if properly planned it could have been carried through this entire period with a very high degree of prosperity.

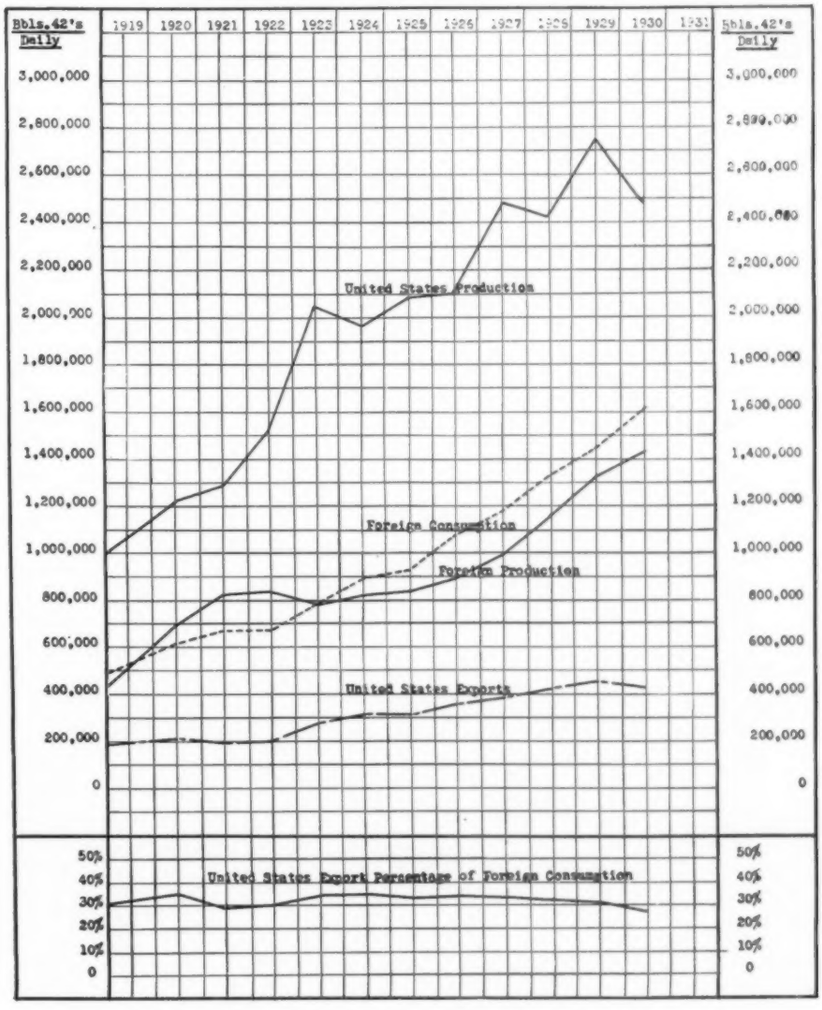
In 1921 when over production of crude oil first occurred Mr. Doherty made up his mind that due to perfecting the science of finding oil, there would be overproduction and demoralization in the oil business, until American oil resources could no longer produce enough oil to supply the country's needs. Today he can see no remedy for this condition except a change in laws, whereby an oil pool is treated as being jointly owned by all of the surface owners above the pool, and administered the same as other jointly owned property. Mr. Doherty feels that the whole matter of controlling the oil industry, has drifted into the hands of politicians, but he does not see how politicians can do a much worse job than oil men have done. In Mr. Doherty's opinion, the oil men of the country have had about as much cohesion and unity of purpose, and about as much effectiveness as a bunch of fire crackers all fired off as a pack.

Drawing attention to the various ways and means of oil companies adding to their sales income, he remarked: "First we added to our business of selling gasoline the very commendable activity of running comfort stations. Next came hot dogs and now miscellaneous merchandise. Our wild and very foolish drilling methods first crippled the coal business and then the coal carrying railroads and now we propose to go into competition with every other line of business. Why not merge the Standard of New Jersey with Sears Roebuck, the Goodyear Tire, the Western Union, the United Hotels, the A and P and all and every description of chain store. That

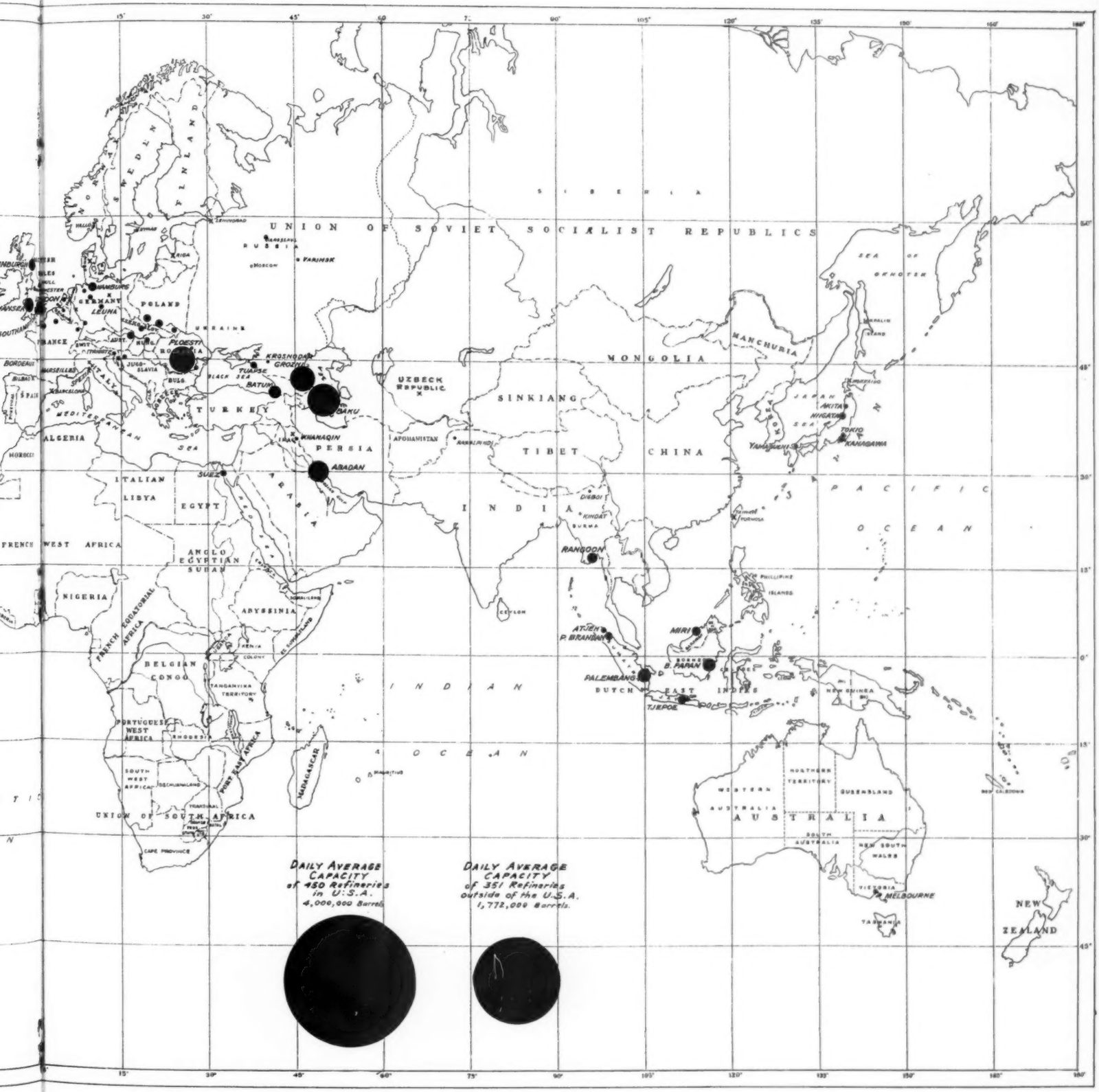
(Continued on page 578)

Relation of United States oil production and exports to the production and consumption of other countries.

Graph by C. J. Bauer



World oil refining outside the United States



Prepared by C. J. Bauer, Standard Oil Co. of N. J.

N. P. A. Meeting

(Continued from page 575)

seems to be the natural trend of what we are doing although we don't seem to realize it."

While Mr. Doherty stated that he had no desire to start another controversy but that—if the industry could fix on a small group of men preferably not more than five, and possibly not more than three, who would have the support of the entire industry—he was not unwilling to work for this group of men and endeavor to show what should be done to put the industry back on a prosperous basis. He declared that unit operation of oil pools was first conceived by himself in 1916 and that the Federal Government stamped its approval on the plan. "There is no hope for the oil industry," he said, "under our present system of producing oil, for, regardless of how much or how little we have in the way of resources, it is bound to be uncovered and the bulk of it is bound to be recklessly and unnecessarily wasted."

•JAMES A. EMERY, in discussing the anti-trust law, which is a subject now before the petroleum industry, declared that it is neither desirable nor practicable to modify or repeal the basic safeguards of the Sherman Act. Human nature being what it is, there are always likely to be combinations which threaten the freedom of trade or the trader; but if the public interest is not served by a continuing surplus, it is not benefited by the waste of our natural resources or demoralization and consequent unemployment in the industries which develop them. Uncertainty, he added, is the brake upon depressional recovery. Men in doubt do not act. Is it not, therefore, wise to provide the means of dispelling doubts which prevent concerted action essential to the control of destructive overproduction?

•JOSEPH E. POGUE gave one of his characteristic talks on economics in the Petroleum industry, which will be found on page 584.

IN his talk on Russia, Col. George A. Burrell, devoted his remarks mainly to general conditions in Russia based on his recent experiences in that country.

UNTIL the latter part of 1929, when Roumania and Russia commenced to cause trouble in America's export markets, foreign oil developments never seemed very important to Americans, beyond their geographical side, said C. J. Bauer in his interesting review of oil refineries of the world outside the United States. Yet Roumania started to produce crude oil two years before the Drake well was drilled in Pennsylvania. New sources of supply, economic conditions and legislation have played leading parts in changing the refining and producing map of the world.

To illustrate the rapidly changing petroleum situation, Mr. Bauer prepared a map showing locations of all refineries outside of the United States and a table of their daily capacities. This map is reproduced on pages 576-577 of this issue. The effect of these geographic movements in the production of crude, and manufacture of refined products, has caused a decided decline in export of petroleum products from the United States. Nevertheless, during the last decade, foreign consumption has increased about 136 percent and exports from the United States, have increased 121 percent. Mr. Bauer considers that this is not a bad ratio.

In 1921, the United States through its exports, supplied 29 percent of the demand of other countries, which increased to over 35 percent in 1924, and then commenced to decline, except in 1926, to 27 percent in 1930, while this year will show about 20 percent of the total. There is no lack of supply of crude in certain other countries, which is now permanently in competition with oil from United States fields.

Regarding the capacities of the more important refineries, it is, of course, very difficult to obtain actual figures. It is not surprising, therefore, that some of Mr. Bauer's figures do not quite tally with those of WORLD PETROLEUM. Additions are constantly made to refineries, increasing their output. For instance, Mr. Bauer gives the great Curacao refinery, as having a capacity of 165,000 bbl. per day. There recently have been added a number of cracking units bringing the plant's present capacity up to 250,000 bbl. per day. Again, on the neighboring island of Aruba, the major refinery's capacity is given by Mr. Bauer as 110,000 bbl. per day. Some more cracking units have lately been added, and the maximum capacity is now close upon 200,000 bbl. per day. Mr. Bauer states that all his Russian figures are quoted from Soviet publications and cannot be verified.

Dealing with Roumania, it ranks fourth as a world's producer. Mr. Bauer indicates its importance in the world petroleum picture. Its surplus of over 100,000 bbl. per day, comes into direct competition with exports from the United States; so much in fact that early in 1931 prices f.o.b. Constanza were the governing factors in establishing prices in the consuming centers of Europe, instead of United States Gulf export prices. Since Mr. Bauer read his paper, a shipment of Roumanian gasoline has reached Detroit, Mich., directly competing with the domestic product.

Spain, said Mr. Bauer, is one of the European countries in which the refining industry is fostered by legislation, and the industry is practically under Government control. On June 28, 1927, a monopoly was established, to develop a refining industry large enough to supply within five years, 80 perecent of the domestic requirements. A 5,000 bbl. per day plant has been completed on one of the Canary Islands. At Barcelona, a 10,000 bbl. refinery has been constructed, and plans have been drawn for three more plants in Spain.

In conclusion, Mr. Bauer stated that the dislocation of foreign trade balances has led some nations to encourage the establishment of their own refinery operations through the imposition of tariff barriers. Such artificial stimulants to home industry offset, perhaps, the greater ability or other advantages of exporters who have carried the business to its present advanced state. Against this somewhat gloomy estimate it should be set out that a large part of the world is still woefully behind in its per capita consumption of petroleum products. If other nations used a small part of the per capita consumption of the United States there would not be enough oil today to meet the demand.

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THE stockholders of the Compagnie Francaise des Petroles have approved the plan to increase the capital of Fr. 315,000,000 by the issue of 220,000 additional shares with a par value of Fr. 500 each for the purpose of providing funds for the new refinery of its subsidiary, the Compagnie Francaise des Raffinage, and for the forthcoming Iraq production and pipe line development.

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A PUBLIC hearing on House Resolution number 391, providing a tariff on imports of petroleum and petroleum products, introduced in Congress last Spring will be held on October 2 in Washington, D. C. at the office of Chairman Harry P. Fletcher of the U. S. Tariff Commission. All interested will be given an opportunity to be heard.

Correcting Evils of Gasoline Tax Evasion

Survey Shows Tax Evasion Is Spread Over United States, and Has Reached England, South Africa and the Antipodes. Corrective Steps Being Taken by Industry and States.

GREAT interest has been aroused in the marketing branch of the petroleum industry by the recent exposures of disgraceful conditions surrounding collection of the gasoline tax in numerous sections of the United States. Estimates of the quantity of gasoline that escapes State, city and county taxes range from one to twelve or fifteen percent of the 14,751,309,000 gallons of taxable gasoline consumed in the United States during 1930. The practice of evading the gasoline tax has become so open in certain sections of the country that agencies independent of the oil industry and the State have drawn attention to the fraud that is being perpetrated on the motoring public, and following exposure of the conditions have called upon State officials and oil companies to make an effort to clean up a situation that is proving ruinous to honest distributors. As a result of this action, particularly in Chicago where the CHICAGO DAILY NEWS undertook a campaign to expose these abuses, attention has been focused on tax dodgers and their activities in many parts of the country. A broad investigation reveals that the evil is not confined to the United States alone, but is beginning to appear in England, South Africa, Australia, and apparently in continental Europe.

WITH Illinois and Pennsylvania leading the way in a campaign to destroy the menace of gasoline tax evasion, concentrated investigation by agents of the U. S. petroleum industry and State tax departments are revealing the extent to which this type of fraud has been carried within the past three years. Cooperation between oil companies, State officials, and transportation companies has been suggested as a cure for the evil by F. V. Martinek, chairman of the recently formed Committee on Gasoline Tax Evasion in Chicago. Pennsylvania State officials emphasize the need of widespread publicity to arouse the industry and the motoring public to the necessity for action. World Petroleum follows its discussion of last month with a brief outline of the basic causes, and the suggested cure for conditions existing in practically every State.

Two Forms of Evasion

ROUGHLY tax dodgers can be divided into two classes. The first consists of dealers who enter the gasoline distributing business simply for the purpose of collecting the large illegal profits of tax evasion by various means, in many cases including such elaborations as dummy corporations, large bulk stations, fleets of tank trucks, and a force of strong-arm men ready to check interference or competition. A second class is made up of consumers who attempt to save money on their purchases of gasoline by evading the tax. It is perfectly obvious that tax evaders with a margin of from two to seven cents illegal profit on each gallon of gasoline sold are in an ideal position to offer ruinous competition to honest dealers, or to engage in the cut-throat price wars that have deranged the entire retail price structure of the motor fuel trade. Important officials of oil companies and other organizations connected with the oil industry have expressed the opinion that gasoline "bootleggers" may be held directly or indirectly responsible for nearly all the important price wars that have occurred recently. While it is true that illegal operators are not likely to compose more than a maximum of 10 percent of the market, it is clear that 10 percent or less can set the price and precipitate price wars that may go far beyond their original intention.

Measures Taken in Chicago

UP to the present the most active campaign undertaken to correct this evil has ben launched in Chicago, Illinois. With a three cent tax, proximity to the Indiana line, a sadly inadequate collection force and the lawless element for which Chicago has become deservedly or undeservedly notorious, the stage was set for the establishment and prosperity of a profitable business in evading the gasoline tax.

The first and simplest method of avoiding payment of the tax on gasoline in this section consists of not reporting sales of gasoline. In order to avoid being checked up by the single investigator covering the seven counties of Chicago's marketing area, many of the dealers failed to procure State licenses and post the $5,000 bond required by the State law. As an example of the effectiveness of this strategy a case is on record where a dealer sent his check to the collector of internal revenue for a small part of the tax due from his gasoline sales. Astonishing as it may seem his check was returned because he had not obtained a license to sell gasoline and, consequently, as far as the State was concerned, simply did not exist as a dealer.

Where the woefully inadequate inspection force has spotted a dealer operating without a license it has been a simple matter for the dealer to continue operations until an indictment was obtained against him, and then move to some other location. In several cases uncovered by the CHICAGO DAILY NEWS, dealers without licenses operating as parts of dummy companies continued to dispense gasoline and pocket the tax for as long as nine months after indictments

had been obtained against them.

Other evasion systems have been taking advantage of the close proximity of the market to the Indiana line to purchase gasoline in Indiana for export, and on that ground decline to pay the tax in that State. By smuggling the gasoline over the State line in unmarked tank trucks at night no record of the delivery has been made to the State and no question of payment of the tax ever arose. In European countries such conditions could not exist, of course, because of the presence of customs officials at borders.

A third system is to blend naphtha with natural gasoline thereby avoiding payment of the tax. Along this same line of activity is the system of blending naptha and kerosene and selling the product as gasoline. Although it is impossible to form an exact estimate of the sums out of which the States have been defrauded by these schemes one of the illicit dealers is quoted as placing it at $1,000,000 per month in Illinois alone.

Billing gasoline in tank cars as kerosene and offering to supply the inspectors with samples in an effort to save them the trouble of taking the samples themselves gave rise to a rapid increase in the amount of kerosene shipped into that State.

Claiming Tax Exemption

PRACTICALLY all these methods belong to the professional evader. One method employed by the amateurs consists in claiming exemption under State laws permitting gasoline to be sold to farmers for use in tractors without payment of tax, as these machines do not make use of the roads and cannot properly be expected to help pay for them. Such exemptions, although used in Illinois, were made use of to a much greater extent in other States such as Oklahoma where, it is stated, the quantity of gasoline alleged to be used in farm tractors is more than that employed by pleasure vehicles. Dishonest dealers amplified the efficiency of this form of evasion by the simple device of raising the figures filled in by the farmers, say from 100 gal. to 1,000 gal.

Some startling facts were brought to light by the investigation of the CHICAGO DAILY NEWS in and about Chicago. It was discovered that of 36 indictments brought in September, 1930, only two cases had been brought to trial 11 months later and these two cases resulted in acquittals. Reporters from the NEWS interviewed drivers of unmarked trucks bringing gasoline across the Indiana line at night and formed some idea of the volume of gasoline that avoided the tax in this manner, as well as the extent of the cooperation between some members of the highway patrol and the truckers.

Committee Formed

WITH the somewhat sensational disclosures of the NEWS, action was initiated by various petroleum companies which resulted in the formation of a Committee on Gasoline Tax Evasion with F. V. Martinek, Assistant Vice-president of the Standard of Indiana, as chairman. The Committee consisted of A. C. Harvey, general counsel of the Pure Oil Company; G. C. Morris, manager of retail markets of the Pure Oil Company; A. H. Sus, manager, Sinclair Refining Company; Paul Hadlick, secretary, of the marketing division of the American Petroleum Institute; M. H. Steindler, superintendent of sales of The Texas Company; Sheldon Clark, vice-president and director, Sinclair Refining Company; and W. R. Allen, attorney, Sinclair Refining Company.

F. V. Martinek, Assistant Vice-president, Standard Oil Company (Indiana)

This Committee secured the cooperation of the Chicago Chamber of Commerce, the prosecuting attorney of the State, who assigned four men to handle cases of tax evasion, and various crime prevention organizations in Chicago. The Chicago Crime Commission made available valuable records of the disposal of cases that had come before the grand jury. As a result of these efforts there seems a good prospect of cutting deeply into the business of evading the gasoline tax. It seems impossible, however, to assure any community of absolute freedom from this type of racketeering as long as gasoline taxes are kept high enough to put a premium on this form of dishonesty.

Methods in Pennsylvania

EVASION methods in Pennsylvania differ somewhat from those used in Chicago, although the difference is mostly one of emphasis. The Schuylkill and the Delaware rivers afford an easy means of bringing barge loads of gasoline into the State without reporting delivery to State officials. A second favorite system is to bill quantities of gasoline for export from Pennsylvania, and then divert them to some other part of the state. According to A. P. Delahunt, Commissioner of Motor Fuels Tax, who is carrying on an energetic campaign to collect the State tax, there is very little trouble with adulteration, and as the law does not allow exemptions from the tax for motor fuel used in tractors for agricultural purposes, there is no fraud in this connection. Conditions in Philadelphia prior to the new Pennsylvania law and the appointment of Commissioner Delahunt, admittedly rivaled those existing in Chicago. Mr. Delahunt, however, has enlarged his staff and with the cooperation of Governor Pinchot and Mr. King of the Department of Internal Revenue has set about cleaning up conditions.

Some measure of success has attended his efforts and more money has been collected under the new lower tax than was collected under the old tax of four cents. While it is impossible to force refiners outside the State to report shipments of gasoline, Mr. Delahunt approaches the problem by having railroads and all transportation companies report shipments of motor fuel into Pennsylvania. A detail of 40 men has been assigned to highway patrol duty, and serves primarily to check up on all tank trucks entering the State. A boat has been provided to patrol the Schuylkill and Delaware rivers and board barges carrying gasoline.

With the change in the law, which makes 400 odd distributors agents for the collection of the tax instead of 28,000 dealers, the problem of keeping in touch with these men has been considerably simplified. Mr. Delahunt has the final say as to who shall hold a license to distribute motor fuel and who shall not. As these licenses are issued only after careful investigation, Pennsylvania has been able to avoid having numbers of distributors operate without licenses or with licenses issued to individuals who

do not exist. In an interview with a representative of WORLD PETROLEUM. Mr. Delahunt recounted several cases where attempts to obtain licenses under false pretences had been checked. One gathers that much could be done to eliminate tax evasion if cooperation were practiced between States as efficiently provided with information as is Pennsylvania. Mr. Delahunt has perfected his system to a point where he can tell officials of other States the destination of every carload of gasoline shipped out of Pennsylvania. If similar information was available in other States, the task of cutting down the supply of motor fuel going to tax evaders would be greatly simplified.

Dishonest State Officials

WHEN Commissioner Delahunt started his campaign against tax evasion he found that the work in some cases was 18 months behind. In an effort to correct this aspect and to collect back taxes it was necessary to enlarge the staff and concentrate more attention on this division of the department of internal revenue.

In large cities of Pennsylvania, as elsewhere in the country, the greatest difficulty in settling cases of violations of the motor fuel tax law, arises from the cooperation of dishonest State officials with violators. In spite of the Commissioner's confidence in being able to overcome this obstacle, as he has numerous others, experience would indicate that many delays and difficulties may be anticipated in cleaning up the State as long as certain officials in the larger cities are willing to share the bootleggers profit and guilt.

Evil Is Widespread

WHILE it may be assumed that tax evasion has been more extensive in Illinois and Pennsylvania than in some other States, it is the opinion of those who have made a study of the subject that the evil exists in every section of the country. In the Gulf States new possibilities are uncovered by exemptions from the tax granted to fishing boats; the usual increase in consumption in fields exempt from payment has occurred in the last few years. Texas, California, Massachusetts, and numerous other States have uncovered enough information to know that the tax dodgers are operating extensively in their territory.

Florida with a seven cent tax presents itself as an excellent field for future operations, but seems so far to have escaped the attention of the racketeers, possibly because of the expense involved in establishing a distributing business in that State. With other States making every effort to drive out professional tax dodgers it is obvious that the possibility of a seven cent per gallon profit will not long be neglected by racketeers unless advance steps of a precautionary nature are taken in Florida, making it difficult for the bootlegger to operate.

While some gasoline bootlegging is being carried on in New York and Connecticut, conditions apparently have not become serious in these States because of the small margin of profit offered by a two-cent tax. The only method of evasion suggested as prevailing to any great extent in New York is the falsifying of delivery invoices.

Spreading to England

SOME idea of the extent of this growing menace to honest marketing may be obtained from an angle hitherto neglected in publicity given to this problem; that is, its appearance in England. The Society of Motor Manufacturers and Traders recently issued a warning to motorists to avoid cheap motor fuel, as it is in many cases adulterated with kerosene, or with a non-dutiable spirit intermediate between benzine and kerosene, and so is exempt from the tax, which has just been increased to 8d, or 16 cents. Adulteration runs from five to 30 per cent and may be extremely damaging to motors due to its high boiling point.

Conditions in England have progressed to a point where it has been felt necessary to form a band of inspectors to patrol the country testing motor fuels in an effort to protect the public. It is probable that a tax of 2d. will be imposed on all kerosene blended with motor spirit within the near future.

Tax evasion has not apparently approached anything like the proportions it has reached in the United States. This may be due to the fact that only one of the two elements, necessary for the growth of tax dodging, is present in that country; namely, the very high tax. While the motor fuel tax easily is sufficient to attract evaders, most of the motor fuel supply is imported and checked by a .government department. England lacks the large lawless element necessary to carry this evil to anything like the high development existing in the United States, nor do there exist the same extensive sources of supplies to bootleggers. The subject of tax evasion in England is dealt with in another article in this issue of WORLD PETROLEUM.

In Australia, where the motor fuel tax is 14 cents per Imperial gallon, considerable adulteration has taken place among dishonest dealers. During the first four months of the present year, says the SYDNEY MAIL, over 20 percent more mineral turpentine was imported than during the same period of 1930. This has caused the N.R.M.A. to suggest that motor fuel from certain pumps at a number of garages continues to be heavily adulterated, and is confirmed by analyses of samples taken by the association's technical department. Tests reveal that turpentine is mixed with casinghead gasoline, and the result is harmful to the engines of motor vehicles. In the absence of protective legislation the motorist is at the complete mercy of the unscruplous vendor. Adulteration also has been taking place in some parts of South Africa, where an equally high gasoline tax is imposed.

Corrective Measures

PERHAPS the most hopeful sign for those interested in eliminating this racket is the cooperation and interest offered by the large oil companies. The Texas Company has made a careful study of conditions all over the country, and is in a position to offer information and cooperation to any agency which shows inclination and ability to correct conditions. The Atlantic Refining Company has been active in gathering information which may be said to have started the campaign to clean up Pennsylvania. Commissioner Delahunt expressed sincere appreciation of the work done by R. D. Leonard, general sales manager of the Atlantic Refining Company. The Gulf Refining Company either pays taxes when delivering gasoline to dealers, or else reports sales to State departments. Officials of the Sun Oil Company expressed themselves as willing to do all in their power to assist State officials in putting a stop to tax evasion. Interest and cooperation are apparent on the part of the Standard Oil Company of Indiana, Pure Oil Company, Sinclair Refining Company, Eastern Shell and many others.

Naturally all those who have studied the situation look to the American Petroleum Institute for some action in correcting conditions. The Petroleum Institute is faced with the alternative of acting as a clearing house for information and activity by companeis and State officials or, at great expense, going into the business of cleaning up conditions in all the States where tax evasion is practiced. At present the Institute is per-

haps in a better position to furnish information on conditions all over the country than any other one agency. The marketing division of the Institute is following all developments in this connection closely and will take whatever action is possible toward ending the dishonest competition of tax dodgers from which legitimate marketers of gasoline suffer in almost every State of the American Union.

Basic causes for the spread of gasoline tax evasion are the lack of uniformity in State laws regulating the sale of gasoline, lack of cooperation in keeping record of traffic across state borders, inadequate or inefficient machinery for the enforcement of existing laws and finally high taxes on gasoline, affording possibilities of attractive profits to dealers who are willing to defraud the state and pocket the tax.

In reply to a request from WORLD PETROLEUM, F. V. Martinek, chairman of the Chicago committee on gasoline tax evasion suggests the following seven corrective measures.

1. Every shipper of gasoline must be called upon to report shipments to the State tax authorities;
2. Every railroad must make reports of deliveries;
3. A complete and current check of shipments against tax receipts must be carried out;
4. Distributors must be required to obtain licenses and post large bonds guaranteeing faithful and honest reports of gasoline handled;
5. Marking of gasoline trucks to show clearly their owners or operators and source of their load, must be required by law;
6. Activities by State authorities must be supplemented by investigational work by the industry's own agents;
7. The industry and various civic bodies interested in law endorcement must keep on the outlook for evidence of collusion between evaders and dishonest officials and must constantly stimulate vigorous action by the authorities in collecting the tax and prosecuting offenders.

Methods to Be Applied

DISCUSSING the methods to be applied in preventing the evasion of gasoline taxes, Mr. Martinek says:

"Organization of this work from the side of the industry will fall naturally within the range of activities of the American Petroleum Institute as all members of the Institute stand to suffer alike from evasion and to gain by proper enforcement of the laws. It will be the part of local units of the Institute to study local problems and work out methods of cooperating and co-ordinating their activities with those of State and local authorities. A task of more general character will be undertaking to bring about greater uniformity in the gasoline tax laws. The present lack of uniformity is one of the factors stimulating evasion, especially by running across State lines. Through the Institute also can be undertaken that co-ordination of activities to detect, prosecute, and prevent evasion so essential to success in safeguarding the industry from evasion's menace."

Mr. Martinek suggests that the industry is carrying a sufficiently large burden in the taxes themselves and should not tolerate the additional burden imposed by the presence of evaders destroying price stability by making use of an advantage which ranges from two to seven cents equivalent to from 40 to more than 100 percent of the refinery price of gasoline in the competitive struggle.

"In making the fight the industry will be benefiting not only itself, but also the motoring public at large," he points out. "The gains in tax evasion are losses to the State treasuries and to the funds used for the most part in building better roads and highways. It is even possible that some of the clamor for higher gasoline taxes would subside if evasion could be eradicated, as full and fair collection of taxes due under existing laws would certainly increase to a material degree their yield under present conditions. In Illinois alone the present tax loss is estimated to be $400,000 per annum."

▼

Petrol Tax Evasion in Great Britain

Methods of "Pirate" Motor Fuel Distributors Discussed by the Economist of London. Admixture of 16 Percent of Non-Dutiable Spirit Affords Saving of One Penny, or Two Cents per Gallon.

THE increasing intensity of competition in the oil industry is compelling the distributing companies to work on an extremely narrow margin, and, in consequence, a great deal of attention is now being paid to the cost of distribution of petroleum products, and particularly distribution of petrol, as it is in this commodity that competition is keenest.

There are two distinct systems of distribution in Great Britain. The "national" companies offer a system of distribution covering the whole country and based on a number of ocean installations, where petrol is landed and stored, and from which it is transported, mainly by rail tank cars, to inland depots; of these the "big three" companies have some six hundred each. Several motor lorries operate from each depot and distribute the spirit to all customers within the geographical area served by the depot, in this way giving a uniform level of service to every town and village in the country.

The so-called "pirate" companies work on an altogether different plan. They make comparatively little use of inland depots, but normally deliver direct from the installation to the customer, using only long-distance motor transport. In this way a considerable amount of handling charges and all depot expenses are eliminated; but, on the other hand, close working of the ground and im-

mediate attention to customers' orders are not practicable. The "pirates," therefore, concentrate on the easy and obvious delivery points, almost entirely on the main roads. A motorist who never left the main roads would, in fact, obtain quite an erroneous view of the relative strength of the "pirates" and the "national" companies in the country as a whole.

The "national" companies have one enormous advantage over the "pirates" in that, as they are distributors of well-known and well-advertised brands of uniformly high quality, the "pirates" must substantially undercut the "national" price in order to obtain a market. The "national" companies market motor spirit at two prices— the so-called "No. 1" motor spirit and benzol mixtures, retailing at 2d. (four cents) per gallon more than the commercial grades, formerly known as "No. 3" petrol. The "pirates'" also market two grades of motor spirit; but with this difference,— that the sales of their superior grades are negligible, demand being almost entirely concentrated on their cheaper products.

It is found in practice that private motorists tend to buy either the best or the cheapest spirit available, while commercial vehicle owners usually prefer a sound medium-quality spirit. It is probably for this reason that the "pirate" companies pay so little attention to their more expensive grades, as, if they did so, it would be more difficult for them to find a market for their cheaper spirit, which not a few of them are careful to avoid describing explicitly as "commercial" petrol. They try rather to give the impression that it corresponds to "national" No. 1 spirit, although retailed at a price slightly below that of "national" commercial-grade spirit.

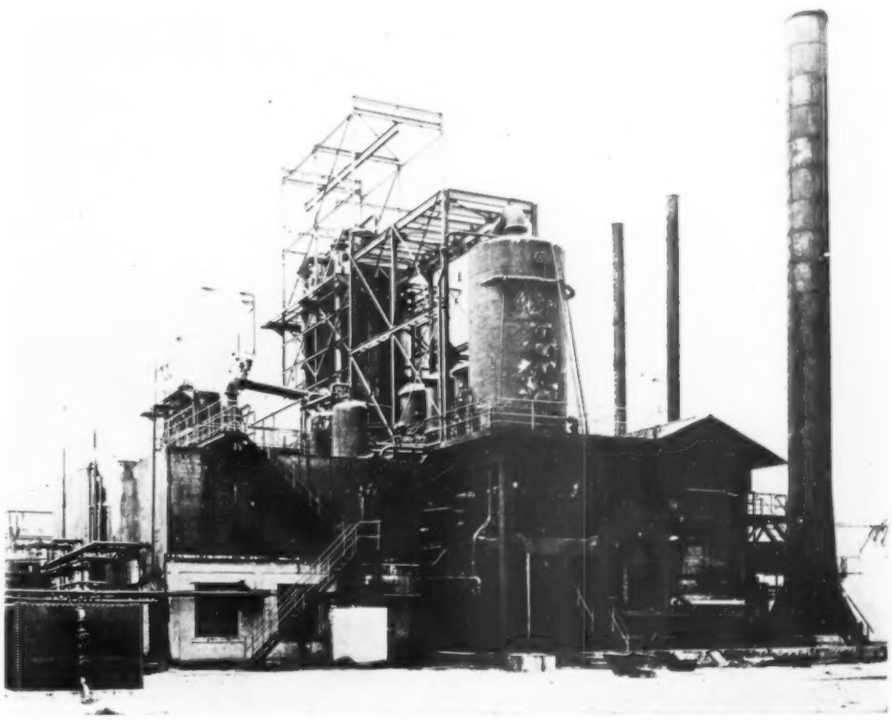
In a fight of the kind now being waged between the rival groups of petrol distributors of Great Britain, there are only three ways in which a "pirate" company can continue to undersell the "national" companies without working on an even narrower margin than that of the "national" companies.

The first way is by reducing the profit to the garage on the sale of petrol; this is now 2d. a gallon on national "commercial" grades and 2½d. on national "premium" grades. A dealer might increase his total profit on motor spirit by selling a popular "pirate" spirit at a smaller profit than the standard; but this would last only so long as he was the sole dealer in the district doing so, and kept a monopoly of the demand for cheap spirit. For this reason any attempt on the part of the larger "pirate" companies to reduce the dealer's standard profit would be bad policy. Another way of achieving the same end would of course be for distributors to retail the spirit themselves through their own service stations, but this also has its drawbacks. Unless confined to sales of oil and spirit, such stations create ill-will among garage proprietors, who naturally resent an infringement on what they consider their proper sphere; while service stations which merely retail petrol and oil without undertaking the other functions of the garage industry can rarely be run at a profit. A further consideration is that the construction and equipment of suitable service stations involves a capital outlay beyond the means of the ordinary "pirate" company. On the whole, any diminution of the retailer's margin by the "pirates" must be ruled out as impracticable.

The second method by which "pirate" costs can be kept permanently below the level of the national companies is by adulterating petrol which has paid duty with non-dutiable spirit of a type intermediate between benzine and kerosene. With a petrol duty of 6d. (12 cents) a gallon, an admixture of 16 percent non-dutiable spirit gives a saving of one penny per gallon in costs. A bigger percentage of non-dutiable spirit gives, of course, an even greater saving; while a moderate degree of adulteration is not easy to detect, since a chemical analysis of a mixture of fairly good petrol with spirit just below the dutiable range may give results very similar to an anlysis of a very poor grade pure petrol. Adulteration of this kind, if proved, would render the culprit liable to prosecution for evading the petrol duty, provided that the final mixture came within the dutiable range; but, for the reasons given, conclusive proof is exceedingly difficult to obtain. Although the more reputable "pirate" companies could certainly never be suspected of action of this kind, there is not the slightest doubt that it is a common enough practice among their less reputable competitors. The increase in the petrol duty last April from 4d. to 6d. per gallon, combined with the further falls in the price of petrol, have immensely increased the temptation to perpetrate this type of fraud. [An additional 2d. in tax has just been imposed— *Editor*, WORLD PETROLEUM.]

The third way in which the "pirate" can undercut the "national" companies, and at the same time obtain the same net return on the petrol he distributes, is by keeping his distribution costs on a permanently lower basis. The greatest problem facing the national distributors at the present time would appear to be the reduction of their distribution costs to the "pirate" level, without any deterioration in the service they now give. They have the initial advantage of the much greater gallonage of their spirit going into any one area, and the much greater number of ocean installations under their control.

Anglo-American Oil Company's refinery at Fawley, near Southampton, England



Economic Law in the Petroleum Industry

Joseph E. Pogue, Well Known Oil Industry Economist Discusses Before National Petroleum Association, Importance of Supply and Demand and Possible Outcome of Military Action

EVENTS of the past few years have clearly demonstrated that the petroleum industry is subject to fundamental economic laws which efforts within the industry are powerless to circumvent. This basic fact is perhaps not fully appreciated in all quarters, for artificial action has from time to time influenced price movements and thus had the appearance of effectiveness, but the fact remains that *price levels*, as disinguished from price fluctuations, are still determined, under competition, by the broad conditions of supply and demand. It is only by modifying the elements of competition that resultants of normal economic law can be deflected by collective effort.

It is coming to be generally recognized that the particular efforts to control the supply of crude petroleum that became conspicuous in the oil business since 1927 resulted in overexpansion and overdrilling, and thus became an important factor in contributing to the price debacle of 1931. It is not so generally appreciated, however, that oil prices in 1931, falling to uneconomic levels, were under the same compulsion to rebound therefrom as they were to recede from the higher artificial levels of 1929-1930. In each instance, artificial efforts were unable to maintain a price level out of line with basic conditions. The recent extraordinary and apparently extra-legal actions of the Governors of Oklahoma and Texas were incidental to the price rebound and the medium through which the readjustment was facilitated; they cannot be properly regarded as causal. The importance of this action would appear to lie in the contribution that these State officials have made toward a breaking down of legal inhibitions that stand in the way of reforms so signally needed in the petroleum industry. If this remarkable example of direct action should prove to be an opening wedge in the revision of the absurd and illogical law of oil and gas that disturbs the ethics and economics of a great industry, an important forward step will have been taken.

AN important contribution toward breaking down the legal inhibitions now standing in the way of reforms signally needed in the petroleum industry, is to be found in the use of military force by the governors of Oklahoma and Texas. These extraordinary actions were incidental to the price rebounds, and consequently cannot be regarded as causal. If this direct action should prove to be an opening wedge in the revision of the absurd and illogical law of oil and gas now disturbing a great industry, an important step will have been taken. Any artificial action that will do in a short time what economic laws will do in a long time is sound.

It is apparent to many observers that the petroleum industry suffers from two flaws, one peculiar to oil business and the other common to many other lines of activity. Fortunately both flaws are subject to correction, although the accomplishment is not easy and progress would be facilitated by a more general appreciation of the difficulties and what is needed in the way of correction.

The first flaw is of long standing and pertains to the competition forced by law between leases in the single oil pool. This form of competition is a great handicap to the orderly and efficient operation of the oil business, for it inevitably creates both physical and economic waste, raises costs, and renders the industry insensitive to retardation by falling prices. These conditions are brought about by the fact that the law, as now applied to oil and gas, does not protect underground oil property, but on the contrary legalizes the robbery of this property by aggressive neighbors. Thus intelligent owners of oil property in competition with aggressive operators are forced to offset the efforts of the least enlightened operators, and hence the whole oil business is periodically reduced to the economic level of its lowest common denominator. So long as this law exists, the oil business will be subject to periods of extreme disorder and cannot be operated at any time with proper efficiency. The solution of this difficulty is technically simple—a revision of the basic law of oil and gas—but all the forces of inertia, ignorance, tradition, and misdirected self-interest stand in the way of this reform.

The second serious flaw in the petroleum industry is its over-development. As all oil men know, there are too many oil wells, too many refineries, too many filling stations, and too much oil in storage; in short, too much capital has come to be engaged in the industry. Such a condition, in an era of maturing demand, brings into operation the law of diminishing returns, and it is futile to attack this problem except at its source. This flaw, however, is more susceptible of correction than the matter of inter-lease competition, for a period of low prices will create renewed balance through the elimination of high cost facilities and a retardation of drilling and discovery. Danger is that artificial methods will retard the slow, correction of this factor by removing the brakes before the machine has lost its momentum.

(Continued on Page 599)

Urge U. S. to Stop Refined Importations

Special Committee Representing Okahoma Conference Would Cut Crude Imports to 140,000 Bbl. Daily and Bar Manufactured Products. Conflicting Claims Advanced

ADDING one more to the troublesome questions piled upon the political doorstep of the Administration, a special committee appointed at the oil stabilization conference held earlier this month at Oklahoma City, laid before Secretary of Commerce Lamont on Sept. 21 a request for a virtual embargo upon the importation of refined petroleum products into the United States.

The petition is politely phrased and proposes "that the importing companies be requested by you (the Secretary), during the remainder of 1931 and as long as the stabilization program is enforced by the principal oil producing states, to forego completely the importation of any refined products, or by-products of crude oil into this country, and that the importation of crude oil be limited to an amount not in excess of 140,000 bbl. daily. In line with the program approved by representatives of all the principal oil producing states at the Oklahoma City conference restricting the total domestic production to 2,379,000 bbl. daily, it is further suggested that those importing companies, who are the principal producers in Mexico and South America, be requested to limit the production in Mexico and South America to a total not in excess of 531,000 bbl. daily."

In support of its request, the committee, which consists of Thurman Hill, member of the Public Service Commission of Kansas, chairman; Paul A. Walker, chairman of the Corporation Commission of the State of Oklahoma; C. V. Terrell, chairman of the Railroad Commission of the State of Texas; William N. Davis, president of the Mid-Continent Oil and Gas Association, and Wirt Franklin, president of the Independent Petroleum Association of America, says in its petition:

"For more than two years domestic producers have by voluntary action and with the assistance of the regulatory bodies or commissions in California, Oklahoma, Kansas and Texas, held production to less than demand, necessitating withdrawal from stock of more than 22,000,000 bbl. in 1930 and more than 20,000,000 bbl. in the first six months of 1931. There has been no corresponding reduction of petroleum imports.

"At the Oklahoma city conference representatives of all the large oil producing states adopted a still more stringent program of curtailment, with production allowables admittedly 200,000 bbl. daily less than the market demand, so as to require further withdrawals from excessive stocks; and a few days later the regulatory commissions of Texas, Oklahoma and Kansas, by written memorandum, approved this program so far as it applied to the allowable production of those states. But this program will be unavailable unless the im-

Table I

U. S. Imports of Crude and Refined Products
(U. S. Bureau of Mines Latest Figures)

1930	Crude Oil (U.S. bbls.)	Gasoline (U.S. bbls.)	Fuel Oil Incl. Gas Oil (U.S. bbls.)	Other Refined Products (U.S. bbls.)	Total (U.S. bbls.)
January	5,450,000	1,079,000	2,652,000	75,000	9,256,000
February	4,321,000	953,000	2,257,000	14,000	7,545,000
March	4,827,000	1,369,000	2,254,000	91,000	8,541,000
April	5,781,000	1,319,000	1,837,000	58,000	8,995,000
May	4,984,000	1,768,000	1,810,000	25,000	8,587,000
June	5,767,000	1,670,000	2,287,000	71,000	9,795,000
July	5,877,000	1,741,000	2,286,000	13,000	9,917,000
August	5,059,000	1,827,000	2,489,000	13,000	9,388,000
	42,066,000	11,726,000	17,872,000	360,000	72,024,000
1931					
January	4,356,000	1,116,000	2,471,000	14,000	7,957,000
February	4,789,000	948,000	1,956,000	13,000	7,706,000
March	3,715,000	1,607,000	2,449,000	9,000	7,780,000
April	4,162,000	1,348,000	2,091,000	19,000	7,620,000
May	4,512,000	1,050,000	1,788,000	9,000	7,359,000
June	3,978,000	964,000	1,412,000	20,000	6,374,000
July	3,588,000	1,528,000	1,886,000	21,000	7,023,000
August	2,702,000	(3,224,000 imports of all refined products.)			5,926,000
	31,802,000	8,561,000	14,053,000	105,000	57,745,000

Table II

U. S. Exports of Crude and Refined Products
(U. S. Bureau of Mines Latest Figures)

1930	Crude Oil (U.S. bbls.)	Gasoline (U.S. bbls.)	Fuel Oil Incl. Gas Oil (U.S. bbls.)	Other Refined Products (U.S. bbls.)	Total (U.S. bbls.)
January	1,808,000	5,527,000	3,294,000	3,221,000	13,850,000
February	1,732,000	4,888,000	2,835,000	3,400,000	12,855,000
March	1,944,000	6,256,000	3,613,000	2,819,000	14,632,000
April	1,900,000	5,840,000	3,730,000	2,912,000	14,382,000
May	2,202,000	5,012,000	2,401,000	2,055,000	11,670,000
June	2,508,000	7,247,000	3,961,000	3,124,000	16,840,000
July	1,973,000	5,692,000	3,095,000	2,253,000	13,013,000
August	2,407,000	6,687,000	3,057,000	2,819,000	14,970,000
	16,474,000	47,149,000	25,986,000	22,603,000	112,212,000
1931					
January	1,919,000	4,903,000	2,980,000	2,208,000	12,010,000
February	1,710,000	3,606,000	2,555,000	1,831,000	9,702,000
March	1,586,000	2,946,000	2,260,000	2,035,000	8,827,000
April	1,826,000	4,187,000	2,232,000	1,745,000	9,990,000
May	2,268,000	4,992,000	2,675,000	2,170,000	12,105,000
June	2,544,000	3,265,000	2,633,000	1,855,000	10,297,000
July	2,621,000	4,473,000	2,698,000	1,964,000	11,756,000
August	2,867,000	(8,713,000 exports of all refined products.)			11,580,000
	17,341,000	28,372,000	18,033,000	13,808,000	86,267,000

porting companies likewise do their part by materially reducing imports."

The Committee also submitted figures of imports for 1929, 1930 and the first half of 1931 by three large oil companies and expressed the belief that at the solicitation of the Secretary of Commerce, the companies concerned would comply with the curtailment plan proposed.

While the petition goes no further than to ask the intervention of the Secretary of Commerce in inducing the companies referred to in the report to suspend all importations of refined products, to restrict their imports of crude to 140,000 bbl. daily and to cut down production from their foreign wells, it is well understood that if acquiesence with the proposal is not forthcoming another attempt will be made to get Congress to impose an embargo, or at least a heavy customs duty, on imported oil. In any case the advocates of a tariff on oil undoubtedly will renew their efforts to get Congressional action imposing an import duty. Active propaganda in support of this project is being carried on at the present time.

Officials of the companies engaged in importing oil have made no response to the statements of the Committee, but in private discussions they declare that imports actually have decreased in greater proportion than production within the United States.

Conflicting claims in relation to this subject and anticipation that it will come up for debate after the convening of Congress in December, have led to a search of governmental statistics of imports and domestic production. Figures of the Bureau of Mines covering imports and exports of petroleum and petroleum products by months and by products, during the first half of 1930 and 1931, are given on page 585.

As indicated by Table I, imports of crude oil decreased a little less than 25 percent in the first seven months of 1931, as compared with the corresponding period of 1930, while imports of all petroleum products, including crude, have declined approximately 20 percent. Statistics of the Bureau of Mines give the average daily production in the United States for the eight months ending August 31, 1930, as 2,548,750 bbl. and for the corresponding period this year as 2,346,750 bbl., a reduction of roundly eight percent. Apparently the decrease in imports has been considerably greater than in domestic output and the claim that the attempt to improve prices in the United States by cutting down production, is being nullified by an "increasing flood of foreign imports" is alleged by representatives of the importing companies to be without foundation and to have been put out for propogandist purposes.

No indication has been given at the Department of Commerce as to the intention of Secretary Lamont in regard to action on the petition that has been placed before him. Representatives of the oil companies engaged in importation point out, however, that their foreign operations have been greatly curtailed since the beginning of the year, that both production and shipments have been cut down more drastically than in the United States and that hundreds of Americans engaged in these foreign operations have been laid off and have returned to the United States. From the viewpoint of unemployment, they state that the reduction of activities in the Carribean has a direct effect in the United States since the majority of the skilled employes are Americans and their return adds to the unemployment situation in Oklahoma, Texas and California.

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Cooperative Plan for Oil Industry

(Continued from page 567)

to get their respective governments to prohibit drilling altogether, or alternatively to put a tax on drilling of not less than $30 per foot, as soon and as long (and no longer) as the production in the respective countries exceeded the declared "minimum production" as explained above.

THE particular merit of my proposal I consider is that it cannot be wrecked if some members of the industry are not reasonable. It is so difficult to say what *is* reasonable. The conceptions about what is reasonable depend so often on whether I am asked to make a sacrifice for the good of the community or whether I am asking my neighbor to make that sacrifice. Therefore a scheme for which everybody has got to be "reasonable" will never succeed. My scheme could be put into effect promptly, and, relatively speaking, easily.

Since there is so much at stake (the saving of the world oil industry) I hope and expect that the respective governments will give their full co-operation once the matter has been explained to them by their own nationals, and that, if by chance any of the proposed details conflict with the laws of any of the countries or states concerned, the respective Governments will take prompt action to make the scheme legally feasible.

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Roumanian Gasoline Reaches Detroit

A SMALL cargo of Roumanian gasoline, amounting to 10,355 bbl., has reached Detroit, Mich., via Montreal, and it is said to be the first shipment of a 573,142 bbl. consignment intended for price cutting in Detroit district. The shipment has been imported by the Sunny Service Oil Company, which according to newspaper reports plans to sell this motor fuel as cheaply as 12 gallons for $1.00. Doubts have been expressed as to whether such a transaction could be carried out at a profit as the supply had first to be shipped from the oil fields to the seaport of Constanza, thence by ocean tanker to Montreal, where it was transferred to a lake tanker and transported to Detroit via the St. Lawrence canal. In addition to the triple shipping charges, it was also subjected to canal tolls. From Constanza to Detroit, where domestic bulk gasoline now sells at 3.7 cents higher than in Tulsa, Okla., freights amount to about 2.5 cents per U. S. gallon. Shipment from Constanza to Atlantic ports would amount to 1.2 cents, compared with 0.495 cent from Curacao or Aruba.

During the recent gasoline war in Detroit, sales were made as low as 12 gallons per $1.00, but the price was gradually increased to 8 gallons for $1.04. Charles E. Austin, president of the Sunny Service Oil Company, is reported to have stated that he would not be surprised if his company returned to sales at 12 gallons to the $1.00, on the basis that the public is entitled to a good product at a fair price.

▼

Trinidad's Greatest Oil Year

LAST year Trinidad's production of crude oil and output of refined products was the greatest in the island's history, according to figures just published in the 1931 annual Report of the Mines Department of Trinidad.

A total of 9,418,907 bbl. of crude was produced, and 163 wells were drilled, the footage being 372,530 feet, or an average of 2,285 feet per well. The crude is valued by the Government at £1,690,709, and exports of products at £2,790,695.

Diesel-Electric Power for Drilling

Low Operating Costs Likely to Bring About Considerable Expansion of This Form of Drive, Particularly for Wildcatting in Undeveloped or Sparsely Populated Territory.

ALTHOUGH a larger user of Diesel engines than any other single branch of industry, especially for marine and pipeline purposes, the oil industry has only just turned to this power in conjunction with electric drive for drilling. For many years the use of Diesels has been retarded by their comparatively heavy weight, which robbed them of portable characteristics. Recently, the successful development of the light-weight, high-speed, oil engine has emphasized the practicability of using it for electrical drilling of oil wells. W. D. Turnbull, general engineer of the Westinghouse Electric and Manufacturing Company, discusses the economic and engineering phases of its use in opening up new petroleum fields.

DIESEL-ELECTRIC power for oil well drilling is a possibility that many engineers, operators, and contractors are considering, and indications are that its use will grow rapidly when exploration drilling is resumed extensively. Steam and central station electricity have played an important part in the development of the petroleum industry all over the world and have been used successfully for years in oil well drilling and pumping. In addition to steam and electricity practically the entire range of motive power has been applied to oil well drilling at one time or another, with varying degrees of success. None, however, has taken the place of steam and electricity because of the desirable characteristics of these two forms of power. Steam, on the one hand affords the great operating flexibility chiefly responsible for its continued popularity. Offsetting this advantage to some extent is its high operating cost which varies, of course, in different fields with the cost of fuel, water, transportation and rigging.

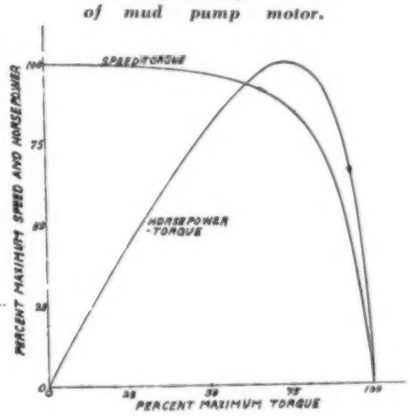
Electricity, on the other hand, being a later development, followed steam in its application to drilling. Its popularity and growth in the petroleum industry, especially in drilling, has increased rapidly. This is a perfectly natural development just as it was in other industries, as the electric drive has certain advantages that make it the predominant source of power in the majority of industries today. A wide net of power lines covers many countries furnishing oil fields with a cheap and dependable source of power. While the type of electrical equipment used—the induction motor—lacks some of the flexibility of steam equipment, its operation has been entirely satisfactory, and its ease of installation and expansion, and low operating cost has been a generous compensation.

Discoveries in recent years of important producing fields in unexpected territories have given a great impetus to exploration all over the world, including sparsely populated sections. Many of these operations are carried on in remote or isolated places where the cost of running high line extensions is not justified for a wildcat location, or until the field is fairly well developed. Usually in these same locations fuel and fresh water for steam operations have to be transported, and consequently are expensive. Diesel-electric drive, therefore, is receiving the attention and consideration of the petroleum industry, as a power unit that not only combines the lower operating cost and certain portability of the electric drive and the flexibility of the steam drive, but also is adaptable to any location in the world.

Diesel-electric drives for electric locomotives and other motive applications have resulted in the development of engine-generator units that are a dependable and economical source of power. Experience with electric shovels, dredges, and mine hoists bearing a similarity to drilling has demonstrated that certain advantages can be obtained in the operation of the drilling rig by use of direct-current electrical equipment and variable voltage control. One of these advantages consists principally of the characteristic of direct-current equipment, when employed with variable voltage control, enabling the speed and direction of rotation of the drilling and hoisting motor to be regulated by a small hand-operated control. This varies the field of the generator and consequently varies the voltage of the motor. An infinite number of speed points is given by this control, with smooth yet rapid acceleration resulting in an even flow of power to the rig. A broad range of speed is easily and quickly obtainable at the will of the operator. A differential winding in the generators gives both the drilling and mud pump motors the ability not only to limit the overload on the motors and generators, but to give this same protection to the engine and prevent it from stalling. In the case of mud pump motors this characteristic gives the correct combination of speed and torque producing large volumes at low pressures, or low volumes at higher pressures, and provides at the will of the operator various combinations by means of the speed adjustment without loss of energy.

Figure 1 is a speed torque curve of the mud pump motor described above, showing graphically that as the torque increases, representing a pressure increase, the speed decreases. This illustrates the manner in which the motor will automatically adjust speed and torque to prevent excessive pressure on the pump and connections, and will prevent stalling of the engine should the bit become plugged or restricted. The curve becomes very abrupt after a certain torque or pressure is reached, causing a rapid drop in speed. This limits the maximum pressure exerted by the pump to a predetermined value. By sup-

Fig. 1. Speed torque curves of mud pump motor.



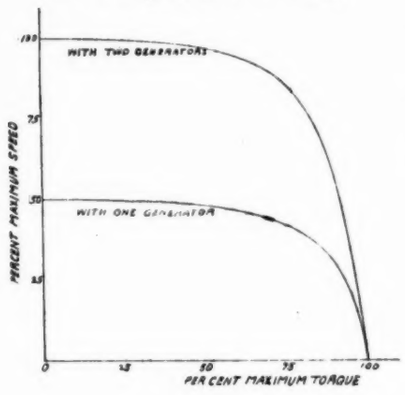
plying the motor with forced ventilation it can remain stalled, thus maintaining the pressure, for a reasonable length of time. Should a partial release of the plug occur the motor will operate slowly at just sufficient speed to maintain the pressure and will automatically and smoothly come up to the predetermined speed and pressure as soon as the plug is removed.

Referring to the drilling motor, the generator winding gives it the same safety factor, so that in case the bit should become stuck, causing the load to build up on the motor, the speed will drop off abruptly reducing the load and strain—not only on the engine and electrical equipment, but also on the mechanical driving equipment, drill pipe and bit. The drilling motor can be adjusted to give high or low speed as desired for drilling, coring, reaming, or any other operation, without loss of energy.

Coming out and going into the hole represents probably the most severe duty on any type of oil field drive, and usually taxes the equipment to its maximum. This may be considered a hoisting cycle similar to that of a mine hoist, a coal or ore tower, or the raising motion of a shovel. For these applications the variable voltage system is admirably adapted. Maximum torque can be exerted at minimum speed thus starting and lifting the load, accelerating it automatically, smoothly, and as rapidly as the size of the equipment and load will permit. The fineness and flexibility of this control and the ease of operation permits an accuracy and quickness that has speeded operations in all the above mentioned applications. This is an important reason for the popularity of this type of control in severe and exacting operations where the requirements are such that the operator has little time to think or act toward protecting equipment.

Installations of Diesel-electric drilling rigs up to the present time have consisted of two Diesel engines each driving a separate and complete generating unit; a drilling motor and a mud pump motor. The drilling motor is operated from one generator and the mud pump motor from the other.

Fig. 2. Torque curves with one and two generators in series.



In hoisting operations (coming out of or going into the hole) the mud pump, except in emergency, is shut down. The drilling motor is used for hoisting, taking its power from the two generators connected either in series or in parallel. Both hook-ups give the full output of both generators and engines during the hoisting cycle and both have been tried and operated successfully.

Figures 2 and 3 show the advantages of each system which may vary in importance with operating conditions. Figure 2 shows the characteristics of the system when both generators are connected in series. The motor develops its maximum torque, which for the purpose of illustration is marked on the curve 100 percent; it also develops maximum speed —marked on the curve as 100 percent. Using only one of the generators and but one of the Diesel engines, the motor still develops maximum torque at one-half the speed possible with both generators. Obviously the advantage of this type of connection is that in the event of trouble with one generator, the remaining generator could pull out of the hole the same maximum load as both generators although at only about half the speed. This, of course, would be entirely satisfactory, as in case of emergency it is torque rather than speed which is essential. The drilling motor in this case has a double rating that for the sake of illustration might be given as follows: 200/400 b.hp., 250/500 volts, 450/900 r.p.m.

Where the generators are connected in parallel the motor has a single rating which might be assumed to be as follows: 400 b.hp., 500 volts, 900 r.p.m., and for all practical purposes would be the same size motor as in the first case.

Considering the same size engines and generators, connected in parallel the same maximum torque and speed is obtained as in the case of connection in series when both generators are operating. When only one generator is in use the same maximum speed is developed as with both generators, but only one-half the maximum torque.

Consequently with the generators hooked in parallel one engine would be able to raise only one-half the load that one engine hooked in series would be able to handle; but the speed, of course, would be twice as great. Wherever there is danger of the pipe freezing in the hole as the result of a breakdown it is clear that the generators connected in series afford the greatest protection.

Portability is a distinct advantage

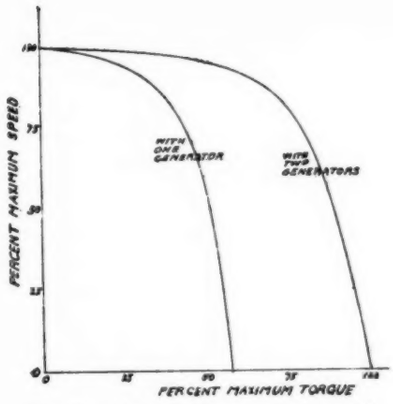


Fig. 3. Characteristics of system with both generators connected in parallel.

with the Diesel-electric unit, as the engine and generator can be mounted on structural steel bedplates and transported without difficulty in trucks or trailers. Choice in location of the power unit is provided by the fact that the engine and generator may be situated at some distance from the rig. If the hole is abandoned, a transmission line can easily be run to the new location. The entire unit is composed of more or less complete units, minimizing the cost of rigging.

In determining the cost of this type of equipment in relation to straight electric, or steam drive, it is necessary to take into consideration first cost and operating cost. The first cost in the case of Diesel-electric drive is necessarily higher than that of steam; but, in the case of steam, this first cost difference is more than compensated by the difference in favor of Diesel-electric power in operating cost. The cost of straight electric depends on the number of wells underway, or the presence of a central station not too far away.

As a means of analyzing and determining these costs it is necessary to make a comparison of the various representative types of motive power used in drilling. It seems logical to consider various fields and territories, and select from this data a figure that would represent an approximate average.

Table 1 is a tabulation of first cost and operating cost made on this basis. Eliminating labor costs, which are more or less comparable on any rig, it is noticable that a large percentage of the operating cost with Diesel-electric drive is in the fixed charges. The fuel and water costs are practically negligible. On a Diesel-electric outfit consisting of two 200 b.hp. engines connected to two 125 kw. electric generators, with a 200 hp. motor on the drawworks and an 125 hp. motor on the mud pump, the fuel consumption over a period of 30 days was slightly more than four barrels of fuel oil per 24 hour

day and approximately two gallons of lubricating oil per day. This apparently excessive amount of lubricating oil was used as a precaution in breaking in the new machinery. About 1¼ bbl. of cooling water was used per day for make-up. This was also considered excessive, as water was plentiful on this particular location and no attempt was made to conserve it. Salt water can be used for engine cooling when fresh water is not available.

On a recent wildcat location in jungle territory that used steam drilling power fuel costs ran $4.50 per bbl. These were primarily transportation charges. Approximately 50 bbl. were used per day representing a cost of over $220 per day for fuel oil. Comparing these costs with the operating cost of the Diesel-electric system there is a saving of opproximately $200 per day in favor of the latter on fuel consumption alone. This very forcefully brings out the ideal application of Diesel-electric power for locations that are remote or isolated.

That these factors and advantages of the Diesel-electric drive are being appreciated by engineers and operating companies in the petroleum industry is evident by recent installations that have been made.

It is interesting to note that following its experiences in California with Diesel-electric drive for rotary drilling, the Standard Oil Company of California adopted this form of power for cable drilling in connection with a wildcatting expedition on an island in the Persian Gulf by one of its subsidiaries, the Bahrein Oil Company. The 400 b.hp. direct-current installation used in California already has been described in WORLD PETROLEUM, and its operating costs given.

One of the most powerful Diesel-electric drilling plants in operation is in service in Louisiana, where the drilling conditions are somewhat similar to those of the Maracaibo Basin in Venezuela. This particular installation, however, is of the A.C. type, and is mounted on a barge. Alternating current was selected so that, in addition to the drilling load, completed wells may be pumped electrically until transmission lines have been built. All the necessary auxiliary apparatus such as exciters, switchboards and in addition a workshop and living quarters for two operators are all contained on this barge. The unit is used for drilling in and around the marshes. The primary reason for this installation was to reduce the cost of drilling in this territory as fuel and water are items of considerable expense, and central station power is not available. Experience so far indicates that this unit has reduced the drilling cost per foot by more than one half. The installation is unique in two ways, first in that it is a complete self-contained floating power unit, second that alternating current is used.

Successful and economical operation of actual field installations have demonstrated the suitability of the Diesel-electric unit for oil well drilling. No doubt this form of power will extend to the oil bearing lands of many countries, especially where development is in process. There is, however, a considerable amount of educational work to be carried out by Diesel engine manufacturers before the oil industry in general becomes thoroughly familiar with the benefits of this economical form of power.

Table 1—Comparison of Rotary Drilling Costs Using Steam, Electric and Diesel-electric Power

Group No. 1—Equivalent to 125 HP. single motor	Steam	Electric (single motor)	Diesel-electric
INVESTMENT			
(Cost of equipment delivered at Oklahoma City, Okla., U.S.A.)			
Boilers, engines and auxiliaries	$13,028.00	.....	$28,500.00
Generating equipmt. and wiring	500.00	$ 1,100.00	9,700.00
Drilling equipment	.....	4,940.00	4,850.00
Mud pumps with drive	4,520.00	14,200.00	12,500.00
Extra freight to California	250.00	200.00	200.00
TOTAL INVESTMENT	$18,298.00	$20,440.00	$55,750.00
FIXED CHARGES (ANNUAL)			
TOTAL YEARLY CHARGE 16% of $18,298, $2930.00; 13% of $20,440, $2660.00; 14% of $55,750, $7810.00			
OPERATING COSTS (DAILY)			
Daily charge to absorb yearly expense of repairs, maintenance, etc.			
(Basis 300 working days)	$ 44.42	$ 16.60	$ 22.40
Fuel, power, labor, water, etc. per day	200.00	141.70	125.40
TOTAL OPERATING COSTS	$ 244.42	$ 158.30	$ 147.80
COST PER ANNUM			
Total yearly fixed charges	$ 2,930.00	$ 2,660.00	$ 7,810.00
Operating cost for 300 days	73,326.00	47,490.00	44,340.00
TOTAL ANNUAL COST	$76,256.00	$50,150.00	$52,150.00

Water White Color in the Near East

A READER in Egypt has sent the following interesting comments on the article on "Water White Color in Motor Fuel," the first instalment of which appeared in the July issue of WORLD PETROLEUM. Our correspondent mentions that his remarks apply mainly to Egypt, Palestine and Sudan, but apply equally well to the whole of the near East areas. His remarks are as follows:

"It is a good English proverb which says: 'You may lead a horse to the water, but you can't make him drink.' The same applies to a benzine user, you can assure him that yellow benzine is as good as, and even better than, some water white benzines; but he will shake his head and decide that the good old water white, crystal clear benzine is the only benzine for his car.

"But who is to blame for this prejudice against colored benzine? You can be certain that the average motorist, especially in the Near East, has very little reason for this prejudice, for he knows nothing of sulphur contents and all the other qualities that interest the refiner nowadays. The industry has only itself to blame in that it has from time to time 'started to ballyhoo' the various qualities of which this or that producer felt proud at the moment. We insisted on pointing out to customers for a quarter of a century or more, the wonderful color of our products, showing 'how carefully they were refined'; now we can hardly be surprised that having changed our story, these same customers jib at our new tale.

"Again, I have asked many customers whether they would prefer a water white or yellow benzine (showing them samples). In every case they choose the water white—because the other 'looks so dirty,' and this attitude is not easy to combat.

"Undoubtedly there is a great waste of material involved in refining benzines to a water white color. As the authors state, refiners can guarantee as good performance from yellow benzine as from water white; but, what guarantee has the average consumer got that he is not being sold a definitely inferior benzine by unscrupulous producers? At present he has at least the assurance that some attempt has been made to refine it because it is water white. As far as I can see, refiners may be quite satisfied with yellow benzine; but it will require a great deal of good salesmanship to make the public buy it, especially in the Near East.

Separating and Mixing Problems

Third Part of Discussions by Horace M. Weir, Chemical Engineer of the Atlantic Refining Company, Dealing with Refining Problems Other Than Those Arising From Distillation.

IN the second installment of this article, published in the September issue of World Petroleum, Mr. Weir in discussing the relative solubility of needle, plate, and mal-crystallin waxes brought out the fact that when needle or mal-crystallin waxes separate from solution simultaneously with plate waxes there is a tendency for either of the first mentioned types of wax to impress their crystal (or non-crystallin) characteristics on those waxes which would otherwise separate as plates. Mr. Weir suggests that this change of the crystal shape of the plates has been shown conclusively to be due to the presence of the other crystals rather than difference in the solvent as pure waxes invariably crystallize true to type irrespective of the solvent employed.

IT probably is clear that good fractionation of the distillate will most certainly be a great aid in insuring the maximum quantity of pressable waxes. But, on the other hand, good fractionation gives no guarantee that some previously satisfactory boiling point distillate may not prove to be refractory to pressing when an unfamiliar crude is involved. It is entirely a question of relative solubility relationship, though the lower end point paraffin distillates are most apt to contain the larger proportion of plate waxes in an environment enabling them to survive with their natural type crystal form.

In this connection it is interesting to note that for many years refiners have observed that "non-pressable" distillates are sometimes rendered pressable by a "cracking" distillation. The waxes are relatively easily cracked and it is quite possible that the ratio of plate to needle and mal-crystallin waxes may actually be changed by this procedure. At least the fact that the plate waxes tend to be of lower boiling point than the other forms, all having the same melting point, is not evidence to the contrary.

While the viscosity of the paraffin distillate at pressing temperature plays an important part in the rate of pressing, it is frequently impractical to dilute a poor pressing distillate; though there is an increase in the rate of filtering with respect to the solution, a net loss of rate with reference to viscosity oil often results. Sometimes the method may be used to advantage if only a limited amount of material must be handled but the permanent remedy is a lower end point paraffin distillate which will give a greater proportion of plate wax crystals.

If a good pressing distillate has been cut in the stills no special handling or continuous chilling device is required to precipitate the wax. Satisfactory units are, of course, always supplied with scraping mechanisms to remove precipitated wax from the cooling walls. The first cost of proper insulation of equipment operating at reduced temperature is high so that the petroleum equipment designer is tempted to reduce investment at the cost of uneconomically high continuous refrigeration charges. Circumstances sometimes necessitate this course, but in any case it is always worth while to substitute the appropriate values in the approximate equation below to learn the actual economic thickness of insulation for the given refrigeration equipment.

$$Y = 8720 \left(Q - \frac{K}{t}\right) e\, c \Big/ f$$

where Y = economic capital expenditure for insulation per sq. ft. applied.

Q = heat interchange in B.t.u./sq.ft./hr./ deg. F. between unit and surroundings.

K = heat interchange in B.t.u./sq. ft./hr./deg.F./ft. insulation thickness.

t = thickness of insulation (in feet).

f = fraction of investment for insulation to be charged off annually for amortization, repairs, etc.

c = cost 1 B.t.u. added or subtracted from unit to be lagged.

e = time efficiency of operation expressed as a fraction of total elapsed time per year.

Standard plate and frame presses have retained their position in the industry by reason of their large capacity and low operating costs. It appears that they will continue to be used with advantage, particularly if these presses are increased in capacity by a simple change. Most standard presses are provided with a single central feed channel through the plates of the press. It has been shown that the rate of filtration can be largely increased by arranging a multiple channel feed so that the oil coming to a partly filled press cell has a much shorter path before it is expressed through the wax cake and canvas. It is entirely practical and economically sound to provide at least five feed channels in a 48 in. diameter plate. The dressing of the plates with cloth is rendered somewhat more difficult and expensive and the cleaning time slightly greater, but not in proportion to the value of the increased capacity.

Separation of wax and oil from those distillates which cannot be handled by filter presses is effected by one of the methods listed under 2 above.

Batch sedimentation of chilled naphtha solution of these wax bearing oils was carried out with variable degrees of success for many years. Attempts to convert the process to a continuous one have not met with marked success. Experiments similar to that cited for the determination of the proper volume for a continuous separation of immiscible liquid clearly indicates the impracticability of the method. The very small differential in specific gravity between the wax particles and the solution, together with the minute size of the former, combine to make settling extremely slow and necessitates very large separators. Furthermore, the disturbance occasioned by the continuous introduction of the mixture and the unavoidable convection currents in large

tankage combine to make the quality of separation poor and the fraction of material remaining undewaxed large. Both batch and continuous gravity separation are, therefore, obsolescent if not entirely obsolete.

The continuous centrifuges which have been on the market for a number of years give a satisfactory physical separation though the investment cost is high.

It is necessary, also, to properly condition the wax and oil in order to obtain satisfactory capacities of these machines. The presence of an excess of asphalt-like materials in solution may render the operation quite ineffective due to the fact that the wax constituents do not precipitate properly at the given low temperature. Such precipitation as does occur is apt to be in the form of unnecessarily finely divided crystals rendering the operation slow and tending to prevent the proper discharge of high wax content material from the machine.

The rate of chilling of the solutions to be centrifuged must not only be slow but it must also be carefully controlled. This makes continuous countercurrent chilling devices difficult and expensive to install. As a consequence chilling is generally carried out in batches which are reduced to the proper centrifuging temperatures at rates of not more than five deg. F. decrease per hour after the point where wax begins to precipitate. The pour point of the oil will usually run from 20 to 30 deg. F. higher than the temperature at which the oil is centrifuged in a dilution of approximately 30 percent oil 70 percent naphtha (a common dilution) and since the wax will usually begin to precipitate from these solutions about 90 deg. F. the chilling time is always a matter of many hours.

There is no doubt that some well planned semi-fundamental research would elicit information on the nature of the wax particles size and the phenomena of centrifuging which could make this interesting operation much less expensive.

Numbers of patents have appeared based on the substitution of solvents other than naphtha in the dewaxing. The entirely different order of cost of solvent is a great handicap to economic use of these methods even though the relative solubility of the wax and oil may be more favorable and refrigeration costs thus appreciably lower. Solvent loss must be reduced to a very small fraction of that which can be tolerated when naphtha is used as a diluent. It may well be, however, that this mode of attack will ultimately prove the direction in which dewaxing costs and performance can be very considerably improved.

There are two types of processes which depend on the addition of relatively high specific gravity materials to which wax particles may attach themselves and be filtered or settled from solution. J. W. Weir, U. S. Patent No. 1,509,325 suggests the process of adding fine clay of an adsorptive nature for this purpose. The second type of process involves the manufacture, from constituents of the oils themselves, of products to which wax will attach itself and be readily precipitated. H. B. Setzler and M. C. McDonald, U. S. Patent No. 1,791,329 propose addition of sulfuric acid to chilled solutions of lubricating oils, thus combining acid treatment of the oil with dewaxing. The former process makes possible the removal of wax by the use of filter presses as well as by sedimentation whereas the latter can only be satisfactorily used at present in combination with some settling procedure. Both processes are known to be effective in operation. The process involving combined acid treatment and dewaxing is not known to be in any but very limited use but it possesses attractive features other than reduction of the amount of handling to which the oil must be subjected. It is, of course, limited to those oils which contain sufficient material to form a relatively large volume of reaction products with sulfuric acid. It is interesting to note, however, that the physical character of the reaction products from lubricating stocks with sulfuric acid at low temperature differs from those obtained by normal temperature treatment in that the material is much more fluid than might be expected. The writer is inclined to believe that either or both of these processes will find a much wider acceptance by the industry in the next few years.

Separation of Liquid Droplets or Mist

THIS type of problem presents itself in at least two forms in nearly every refinery. The vapors in all fractionating towers which are run at a sufficiently high velocity to secure some measure of the potential capacity of the equipment carry a certain amount of liquid entrainment from plate to plate. The separation efficiency of the column is, of course, impaired under these circumstances, but if the column has been provided with more plates than are actually necessary for separation the circumstance is not serious from this viewpoint. On the other hand, in a combination pipe still and fractionating tower where the effort is made to completely separate all required distillates in one operation the quality of the heaviest distillate is always greatly impaired by contamination with undistilled material carried into it as droplets or mist. When it is realized that the vapor velocity of heated material being fed into fractionating columns from a pipe still is frequently of the order of 100 miles per hour or more, the fact that such spray entrainment is bound to exist seems self-evident. The unusual feature in the situation is that many refiners have gone to considerable lengths, such as distillation, to secure good color viscosity distillate, under the impression that this was the only hope of reducing the chemical requirements for purification of such materials.

This statement is not to be taken as derogatory to the process of vacuum distillation, but there is no question that much of the improvement in color quality of distillates said to be the result of vacuum distillation can be secured with atmospheric pressure distillation provided adequate attention is paid to mist removal.

(To be concluded in November)

▼

Krolup Mineral Oil Company's refinery at Krolupy, Czecho-Slovakia.

U. S. Oil Industry Review

	Daily Production (Barrels)	Daily Runs to Stills (Barrels)	Gasoline Stock (Barrels)	IMPORTS Total (Barrels)	IMPORTS Gasoline (Barrels)
Week Ending August 29...	1,740,953 shut-in*	2,453,000	33,215,000	1,195,000	233,000
Week Ending Sept. 5.....	1,736,007 shut-in*	2,456,300	31,184,000	1,825,000	304,000
Week Ending Sept. 12.....	1,919,000 419,400*	2,459,900	31,818,000	1,153,000	264,000
Week Ending Sept. 19.....	1,782,200 419,400	2,431,714	31,123,000	1,694,000	113,000
Week Ending Sept. 26.....	1,764,100 429,250	2,355,571	30,772,000	1,437,000	440,000

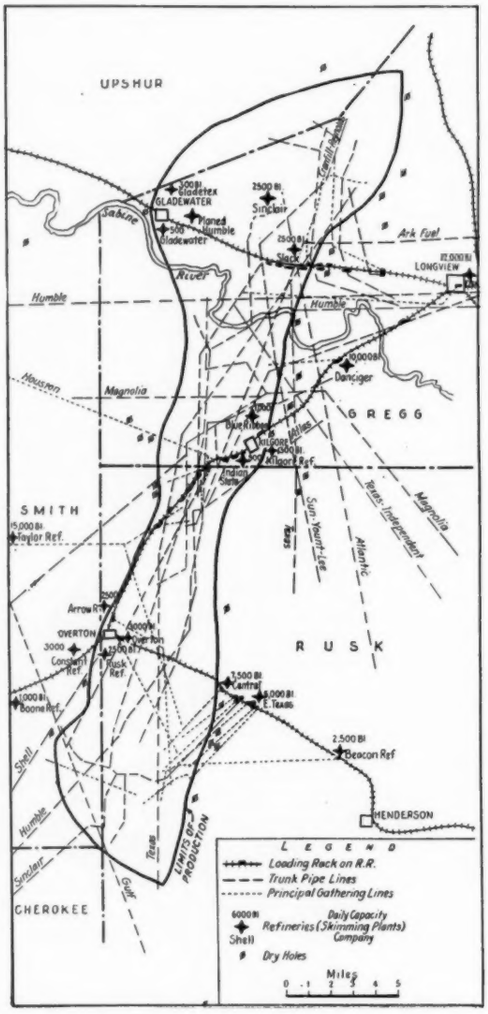
Underlined figures indicate improvement in statistical position—decrease in production, runs to stills, gasoline stocks or imports.
*** Production of the Rusk-Gregg Field, East Texas.**

MARTIAL law has been functioning up to the end of September in Texas and in Oklahoma, no effective opposition being encountered. In the East Texas field the production was entirely shut in for 19 days, and when opened on September 5, the field was allowed to produce only 225 bbl. a day per well, or a total of around 400,000 bbl. per day. In Oklahoma the flush fields still remain closed pending a higher price of crude oil, but it has been unofficially indicated that a compromise in the price originally demanding $1.00 per barrel may be made at an early date. It is expected that the flush fields of Oklahoma will be opened before this issue of WORLD PETROLEUM is placed in the mails.

Up till October 1 the shut-down by martial law in the two states resulted in withholding some 40,000,000 bbl. from the glutted markets of the world, and also in an increase in price of the Mid-Continent crude oil from 20 cents to 62 cents a barrel.

Success of the martial law to date in curbing the crude oil production will in all probability result in its continuation as long as there is danger of overproduction. Skeleton forces of National Guard will remain on duty in these oil fields and martial law will come to be regarded as a radical exercise of police powers of the State rather than a purely military measure. The remaining troops in East Texas totaling about 130 men, have been provided with winter quarters, thus suggesting a prolonged stay.

In East Texas fields the original allowance proved to be too large and the Railroad Commission reduced it to 185 bbl. per well, and also limited new drilling to one well to 20 acres, indicating that martial law is adjustable to changing conditions.



East Texas field, showing pipe lines, railroads and refineries.

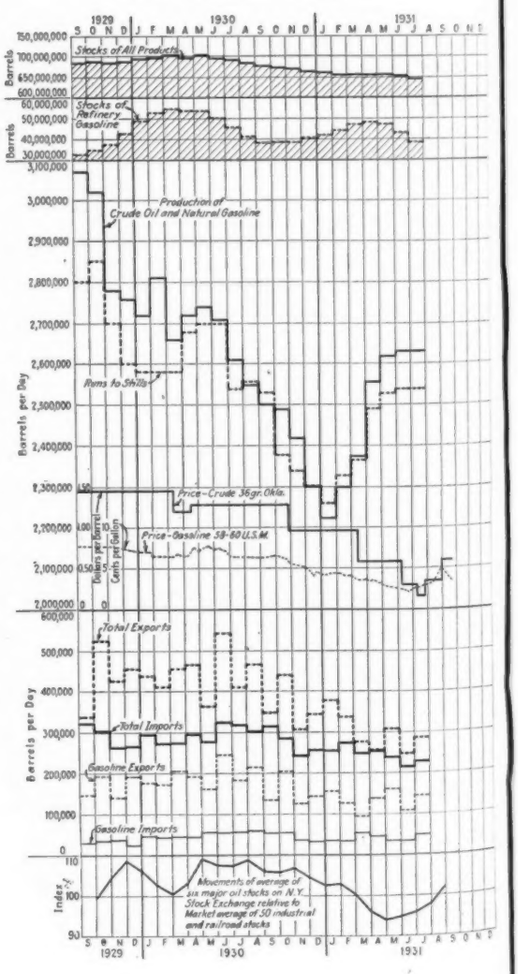
ENCOURAGED by the results the State Conservation officials of Oklahoma, Texas and Kansas met in Oklahoma City on September 11, and proposed to limit the current U. S. A. production to 2,379,000 bbl. per day, further adjusting it in the future as may be required by seasonal variations in demand. The recommended allowances for each State were decided.

Proposed Production Allowance

	Barrels (per day)
Texas	900,000
Oklahoma	546,000
California	500,000
Kansas	110,000
Louisiana and Arkansas	110,000
Eastern States	108,000
Rocky Mountain Area	55,000
New Mexico	50,000

If the State Conservation officials cooperate to achieve the indicated production, and if the Governors stand firm

Statistical position of the United States petroleum industry.



and give them the continued support of martial law ruling, then the set program will be achieved, and not, as formerly, merely mark the issuance of new figures to be immediately neglected due to lack of cooperation and granting of injunctions by minor courts. Thus martial law, no matter how revolutionary a measure, may effect the stabilization of the producing branch of the United States oil industry.

Crude Oil Prices

AFTER the opening of the East Texas field, and after the production from that field climbed to 420,000 bbl. per day, under the 225 bbl. allowance from each well, the crude oil prices in that area weakened, some oil being reported sold at about one-half of the posted price of 68 cents a barrel. This weakness was not due to actual overproduction; but rather to the belief that the Railroad Commission would not lower its per well allowable nor limit new drilling, the latter registering very considerable increase when the first ruling of the Commission became known. If such changes in the original order had not been made, East Texas production would have again soared to over 500,000 bbl. per day, causing another complete demoralization of the crude oil market. The reduction in allowance to 185 bbl. a day per well lowered the total East Texas output by about 75,000 bbl. and caused stiffening in prices. The realization that the Railroad Commission intends to keep production within the market demand will further strengthen crude prices, and may eliminate distress crude oil.

Gasoline Prices

THE indefinite position of the producing branch of the oil industry caused considerable unsettlement in the wholesale gasoline market. At the end of August the price reached five cents a gallon; but currently receded very considerably, ranging from as low as two cents for distress gasoline and up to four and a half cents a gallon. Attempts are now being made to curtail refinery operations, and if the crude oil production will be at all limited, considerable stiffening may be anticipated.

Rusk-Gregg—East Texas

FOR the week ending Sptember 12 the official Rusk-Gregg production averaged 410,609 bbl. per day from 1,879 wells. The limitation of production by a definite amount per well caused a spurt in new locations, which reached a record figure of 164 for the week ending September 12. There were 95 completions in the field during the same week, while about 500 wells are now drilling or rigging up. The major companies at this time are in control of the East Texas situation as the accompanying table indicates.

ON September 19 the Sinclair Consolidated Oil Corporation telegraphed Governor R. S. Sterling to the effect that a great amount of unnecessary drilling was being done in East Texas, and that on the date in question four of the major companies were drilling a total of 237 wells, i.e.—Humble Oil and Refining Company (Jersey Standard), 107; Gulf Oil Corporation, 57; Magnolia Petroleum Company (Socony-Vacuum), 29; Shell-Union Oil Corporation (Royal Dutch), 17; The Texas Corporation, 14, and Sinclair Consolidated Oil Corporation, 13. Sinclair further stated that between September 5 and the date of the telegram these companies other than Sinclair had started drilling 132 wells. Up to September 19 the same companies, including Sinclair had completed 701 wells of which Sinclair completed 76. That on its acreage the Humble Company has completed or is drilling one well to each 33 acres, while Shell has only one well to 79 acres. Magnolia is close to the Humble record with one well to 35 acres; Texas one well to 39 acres; Gulf one well to 45 acres and Sinclair one well to 65 acres.

On September 26, The Texas Corporation telegraphed Governor Sterling correcting Sinclair Company's wire as follows:

" . . . The facts are we have 4,300 acres and have drilled an average of one well to 134 acres, and of this acreage we held 3,500 acres when discovery well was drilled. We have all along regarded the intensive drilling in that section as unfortunate and tending to break down the conservation movement."

East Texas Production Operations of Major Companies

	Own Wells Completed to Sept. 19	Own Wells Drilling on Sept. 19	New Wells Started Since Declaration of Martial Law	Owned Proven Acreage	Acres Per Well, Completed and Drilling, on Own Acreage	Connected to Wells, Own and of Other Companies	Indicated Available Production, at 185 bbl. Allowance
Humble Oil & Ref. Co. (Std. Oil of N. J.)	267	107	61	12,220	33	464	86,000
Magnolia (Std. Oil of N. Y.)	124	29	25	5,336	35	249	46,000
Gulf Oil	136	57	16	8,831	45	139	25,700
Shell Petroleum	67	17	21	6,651	79	..	.....
Texas Co.	31	14	9	4,300	78	..	.....
Sinclair Oil & Gas Co.	76	13	0	5,811	65	77	14,300
TOTAL	701	237	132	40,588	..	929	172,000

THE tremendous over-building of transportation facilities, as indicated in previous issues of the WORLD PETROLEUM, resulted in the under-supply of crude oil for many trunk pipe lines, the Sinclair Oil & Gas Co. for instance moving but around 15,000 bbl. per day, as compared with its total capacity of over 60,000 bbl. Other carriers without their own production are practically without any connections, while a number of smaller refineries were forced to shut down, partly because of the inability to obtain crude oil and partly because they were built to operate on the basis of 15 cent crude oil.

Kettleman Hills—California

THE Petroleum Securities Co.'s Burbank No. 1, located on the Middle Dome at the Kettleman Hills, was drilled to 7,912 feet without encountering satisfactory showings. It is still believed that the Temblor zone will be found productive on the Middle Dome upon deeper drilling, as it was on the North Dome, thus adding very considerably to the total productive acreage of the Kettleman Hills district. Preliminary steps already have been taken to effect unit operation on the Middle Dome in case of discovery, the project calling for an organization similar to the Kettleman North Dome Association.

Greasewood Dome—Colorado

IN October of 1930 the Platte Valley Petroleum Company completed a 350 bbl. well on the Greasewood Dome, about 70 miles northeast from Denver. At the end of August of the current year the Reiter Foster Oil Company's second test in this field, encountered oil at 6,645 feet, producing 1,500 bbl. during the first 24 hours, and settling down to 400 bbl. The oil is of 41 gravity, yielding 30.8 percent gasoline, 13.1 percent kerosene, 12.1 percent gas oil, 26.9 percent wax distillate and 15.6 percent steam refined stock. Because of its high quality it is in demand in the Rocky Mountain area, where heavy crudes so far predominated. At this time there are three wells drilling in the new field and seven are being started. The acreage is controlled by major companies, but is divided in rather small tracts. The Greasewod field will not become a market threat, because wells are deep and cost in excess of $100,000 each to complete. Also the Greasewood Dome field does not promise to be unusually large, the importance of the discovery being due to the possibility of opening several similar fields in northeastern Colorado.

BASIL B. ZAVOICO.

U. S. Soviet Russia Review

Official Figures for Operations, 1931

1931 (Month)	Crude Production (bbl.)	Crude Daily Averages (bbl.)	Runs to Stills (bbl.)	Drilling (feet)
January	12,072,900	389,448	10,399,200	168,458
February	11,141,900	397,925	9,514,400	147,935
March	12,654,600	408,213	11,197,200	226,439
April	12,318,600	410,620	10,569,300	239,699
May	12,796,000	412,774	11,841,900	236,009
June	12,989,900	432,996	11,427,500	227,307
July	13,931,400	449,400	12,248,600	228,706
August	14,066,500	453,758	11,841,200	197,257
Total	101,971,800	419,637	89,039,300	1,671,810

All figures converted from metric tons at seven barrels per ton.

Oil Fields

IMPROVEMENT of Soviet Russian crude production operations in general during July over previous months was continued into August in spite of underproduction in Surakani field where water encroachment has been unexpectedly rapid in the oil sands of the sixth horizon. Another factor generally handicapping operations is the slow tempo of drilling reported to be holding back a large number of wells from production. About 465 rigs were in operation at Baku, of which 91 are exploration drilling, and about 147 rigs at Grozni, of which 40 were exploration drilling, during June, but drilling is making slow progress. At present over 70 percent of the equipment used in the oil fields of Russia is of Soviet manufacture and is of crude construction, consequently it cannot withstand heavy duty without breakdowns. The frequent breakdowns necessitating replacements or repairs are causing considerable loss of time. Spare parts, as well as drilling equipment in general, are scarce and the inefficiency of the operating crews as well as the inability of the management to organize operations efficiently, are preventing fulfillments of quotas under the plan. Endeavors to eliminate some of the factors causing delay are being made by means of changes in the wage system in the form of remuneration by piece work, with special bonuses for skill.

The new Stalin kerosene plant at Baku.

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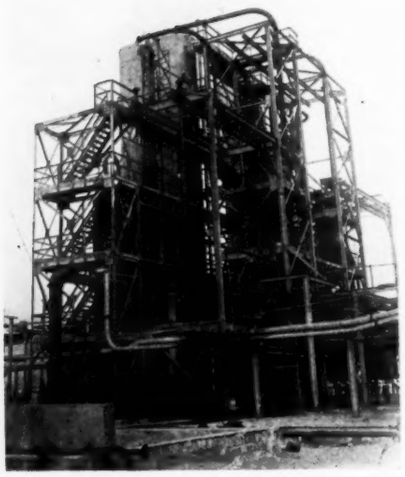

Refineries

ACCORDING to semi-official information several Control Bureaus of Soviet Russia have suggested a general reorganization of the oil refining division. It has been pointed out that refining is the most retarded of all oil operations, as it lags behind those of other countries for such products as anti-knock gasoline, high-grade lubricating oils and refinery by-products. Present oil exports of Russia consist mainly of heavier grades of gasoline, lubricating oils, kerosene and fuel oil. Owing to the prevailing world prices these products are not bringing the expected revenue. A general mobilization of all engineering resources of Russia is to be undertaken shortly in order to attain products of high quality to meet present requirements of the internal and export markets.

Gasoline

RUSSIA has not yet appeared as a competitor in antiknock gasoline in world markets, and the lack of this grade for the home markets is causing damage to numerous stationary and mobile motor outfits in operation all over the country. Soviet gasoline specifications meet general requirements, except in regard to anti-knock value. The situation is bound to improve gradually with the placing in operation of cracking plants now under construction. Nevertheless, treating plants required for cracked gasoline are still lacking, and this condition will hold up progress for some time to come. The technical mind of Soviet Russia, as an editorial in one of the leading journals of the Soviet oil industry puts it, is at present directed toward the design of cracking equipment for liquid and vapor phase, tending more towards the latter as it insures greater yield of high anti-knock gasoline of definite value for export and internal use.

Seven years of Soviet Russia's tinkering with cracking, of which Russian engineers are said to be the originators—has resulted in having to face the necessity for reconstruction of recently-built cracking plants to convert them into vapor-phase units, which have become today's refining vogue. When A. P. Serebrovsky was head of the oil Syndicate of Soviet Russia about seven years ago he visited the United States and negotiated with the M. W. Kellogg Company for the acquisition of Cross cracking units for Azneft at Baku. Orders placed here were cancelled by him while in London on his way home, which, it is said, was done under pressure from Ch. Rakovsky, then head of the Diplomatic and Trade Delegation of Soviet Russia in England. Rakovsky believed that he could improve relations between his country and England by transferring the order for the equipment to Vickers, Ltd., of London. Apart from the political aspect the Soviets had then succeeded in an economic deal by obtaining long term credits from the British manufacturers in the way of deferred payments over a period of more than three years. But, it took about three years to erect the plants and bring them under satisfactory operation.

During the last four years several leading technologists of Russia have been in the United States studying crack-

ing. Under the direction of M. Barinoff, chairman of the Azneft, several orders were placed for cracking equipment of Jenkins type with Graver, Winkler-Koch and others, which were completed within six month of the date of order and were put under operation within one year. No further orders are known to have been placed with the Kellogg Company; but steps have been taken by the Soviets to design and to construct Cross-type cracking units in Russia for which purpose funds were appropriated and orders given to speed up the work.

Gasoline Specifications

THE following are specification of Russia gasoline as produced for export:

Specifications of Russian Export Gasoline for Current Delivery

	Grozni heavy	Grozni light	Baku
Specific gravity (not over)	0.740	0.727	0.750
Initial boiling point (not over)	70 deg. Cent.	60 deg. Cent.	80 deg. Cent.
Distillation up to 100 deg. Cent. (not over)	20 percent	40 percent	20 percent
Distillation up to 160 deg. (not under)	80 percent	92-93 percent	80 percent
End boiling point (not over)	.....	.....	195 deg. Cent.
Residue and losses not over	3 percent	3 percent	3 percent

After November 15, 1933, Grozni cracked gasoline will have the following specifications, and these grades are expected to have high anti-knock values.

Specifications of Russian Export Gasoline for End of 1932 Delivery

	Light	Heavy
Specific gravity (not over)	0.730	0.750
Initial boiling point	52 deg. Cent.	60 deg. Cent.
Distillation up to 100 (not under)	40 percent	20 percent
Distillation up to 160 (not under)	90 percent	75 percent
Distillation up to 175 (not under)	96 percent	.....
Distillation up to 200 (not under)	.....	96 percent
Residue and losses (not over)	4 percent	4 percent

Lubricating Oils

AZNEFT is the only trust of Soviet Russia manufacturing lubricating oils for both export and domestic consumption. Methods used and the equipment are old and obsolete, consisting of a few manifold type shell stills erected some 30 years ago by Nobels at Baku. Growing requirements of high quality lubricating oils have so far failed to produce any modernization of methods and means employed. Exports of lubricating oils at present consist mainly of a cheap grade of a machine oil of pre-war specifications equivalent to the grade known in the United States as red engine oil, 500 viscosity No.5-6. Yet some of the Russian crude can make the world's finest lubricants. There is none better.

It might be mentioned for comparison purposes that in 1913 the plants at Baku refined about 9,100,000 bbl. of fuel oil for the manufacture of lubricating oil, while plans for 1931 call for the refining of some 12,600,000 bbl. of fuel oil for the same purpose, the increase in 18 years being only 38 percent; but the increase of production of crude oil in 1931 over 1913 amounts to 300 percent. This may be due to gradual depletion and exhaustion of the light oil reserves known for their lubricating oil content. Production of these crudes in 1931 amount to 24,500,000 bbl., and have since dropped to the 14,000,000 bbl. planned for 1931. Schedules for 1932 and 1933, the last two years of the Five year Plan, call for not less than 21,000,000 bbl of lubricating oil, against 5,600,000 bbl. scheduled for production this year.

Construction plans call for the erection of 11 new lubricating oil installations—some at Baku,—in addition to the Max Miller bright stock plant ordered in the United States. The new plants will include bright stock istallations and high-vacuum pipe stills for the distillation of heavy sludges. Heavier oil grades will be employed for the manufacture of lubricating oil in order to offset the effects of the depletion of the light oil grades. Treating plants will be erected at the rate of 4,200,000 bbl. capacity per year. Most of the new treating plants will be arranged for contact filtration with bleaching earths of Soviet origin. Installations are to be erected for the extraction of sulphuric acid from the rich shale deposits in the Caucasus. The capacity for wax is being increased from 16,000 to 25,000 tons by 1932.

J. WEGRIN.

World Oil Production Figures--Official

All figures furnished direct to World Petroleum by Governments, except where otherwise specified

(Conversion ratio 7 bbl. = 1 ton)

	Total 1930 (revised) (barrels)	1st 6 mos. 1931 (barrels)	JANUARY (barrels)	FEBRUARY (barrels)	MARCH (barrels)	APRIL (barrels)	MAY (barrels)	JUNE (barrels)	JULY (barrels)	AUGUST (barrels)
United States	898,011,000[7]	421,392,000	65,991,000	60,645,000	69,375,000	73,101,000	77,164,000	75,116,000	77,961,000	74,831,000
Venezuela	141,652,832	60,025,709	10,579,707	9,806,034	10,705,814	9,579,784	9,834,545	9,519,825	10,339,028	10,133,319
Russia & Sakhalin	129,955,417	73,973,900	12,072,900	11,141,900	12,654,600	12,318,600	12,796,000	12,989,900	13,931,400	14,066,500
Persia[6]	43,549,323	21,659,481	3,201,156	3,079,132	3,081,260	3,442,341	4,296,642	4,558,950	4,404,106	4,434,507[4]
Roumania	39,876,589	23,694,930	4,233,810	3,570,000	3,856,020	3,850,000	4,195,100	3,990,000	4,046,000	3,886,680
Mexico	39,529,639	17,076,457	2,890,903	2,563,986	2,819,430	2,761,039	3,080,603	2,960,496	3,129,042	2,841,438
Dutch East Indies	38,722,250	16,952,992	3,226,854	3,225,000	2,625,285	2,625,285	2,625,284	2,625,284	2,750,000[5]	3,000,000[5]
Colombia	20,343,176	9,380,050	1,657,694	1,565,425	1,774,865	1,467,429	1,479,452	1,435,185	1,490,524	1,512,528
Peru	12,455,888	4,969,945	986,902	662,022	1,131,155	914,342	762,624	512,900	1,005,712	793,677
Trinidad	9,418,907[4]	4,824,997	831,522	744,518	844,534	798,134	788,528	817,761	842,884	891,908
Argentina	9,001,671	5,505,965	898,007	796,578	875,400	833,700	1,038,780	1,063,500	1,022,900	1,006,100
India (British)	6,936,315	3,689,933	662,604	635,743	705,568	553,912	563,126	568,980	570,000[5]	570,000[5]
Sarawak	5,251,541	1,778,295	326,956[1]	231,090	314,927[3]	309,876	302,295	293,151	288,806	283,563
Poland	4,645,550	2,209,455	390,600	350,700	381,500	357,000	372,155	357,500	377,300	374,997
Japan & Taiwan	2,250,000[5]	1,172,500[5]	197,500[5]	195,000[5]	195,000[5]	195,000[5]	195,000[5]	195,000[5]	195,000[5]	195,000[5]
Egypt	1,977,660	979,093	196,021[1]	158,210	162,225	160,573	152,418	149,646	143,311	146,468
Ecuador	1,596,238	835,561	137,531	120,145	126,544	117,763	169,111	164,467	177,085	168,228
Canada	1,535,827	954,101	179,711	155,651	160,358	153,705	156,392	148,284	119,327	133,014
Germany	1,209,185	596,194	127,894	98,000	100,030	77,833	95,438	96,999	97,930	107,616
Iraq	980,000[8]	600,000[5]	100,000[5]	100,000[5]	100,000[5]	100,000[5]	100,000[5]	100,000[5]	100,000[5]	100,000[5]
France	516,642	240,225[5]	40,075[2]	40,075[2]	40,075[2]	40,000[5]	40,000[5]	40,000[5]	40,000[5]	40,000[5]
Czecho-Slovakia and others	220,000[5]	164,700[5]	25,900[5]	25,900[5]	25,900[5]	29,000[5]	29,000[5]	29,000[5]	29,000[5]	29,000[5]
Total	1,409,635,650	673,676,483	108,955,247	99,910,109	112,055,490	113,786,316	120,236,493	117,732,828	123,060,355	119,545,543

[1] 4 weeks to February 6th. [2] Official total, 1st quarter 120,225. [3] 4 weeks to April 17th. [4] Revised. [5] Estimates. [6] Anglo-Persian Company's figures. [7] U. S. Bureau of Mines final figures. [8] Actual production in Iraq probably higher than official total. [9] Average of official total for March-June period.

Mexican Oil Activities

Annual Report

THE importance of greater attention to growing domestic consumption is emphasized in the annual review of the petroleum industry in Mexico issued by the petroleum department of the Ministry of Industry, Commerce and Labor. The review calls attention to the restriction of petroleum activity resulting from low prices prevailing in the principal world markets, especially the United States. In spite of the restraint placed on exploitation by low prices several important fields were discovered and these are listed by the review. The greatest exploration activity has taken place on the northern frontier, in the region of the Panuco and Tamesi rivers, in the southern region of Tuxpan, in the Isthmus of Tehuantepec, and in Tobasco and Chiapas States.

The review expresses satisfaction over the fact that although work in the Mexican oil fields has been subjected to severe restrictions, wells in that country have an effective average daily production of 221 bbl. against 0.75 average daily production per well in the United States.

Comment on the decrease in production is brief. Mention is made of the fact that Mexican production decreased from 44,687,879 bbl. worth 92,025,441 pesos in 1929 to 39,529,901 bbl. worth 80,932,254 pesos in 1930. Mexico therefore, occupies sixth position among the oil producing countries of the world.

Drilling Statistics

Number of wells brought in	52
Daily capacity, new wells	52,446 bbl.
Total wells, June 30	1,676
Total daily capacity, June 30	410,737 bbl.

Production and Exports

Production first half 1931	17,076,926 bbl.
Commercial value prod. 1st half 1931	35,241,858 pesos
Total production since 1901	1,616,493,765 bbl.
Commercial value of total prod	2,937,614,000 pesos
Exports, first half 1931	12,172,843 bbl.
Domestic production exported	12,166,941 bbl.
Foreign production exported	5,902 bbl.

The review explains the increase in products obtained by refineries as being due to greater attention on the part of refiners to growing domestic requirements.

DOUGLAS GRAHAME.

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Shipping

October

FORTY pounds sterling, or less than $200 was the total cost for machine repairs for the Norwegian owned tanker TURICUM from the time of her completion in January, 1928 until the end of 1930. This vessel is a 10,850 tonner built in Holland having two Diesels of 3,100 total i.hp. for propulsion. Details have recently been sent to WORLD PETROLEUM concerning the ship's operation from Ocotber 5, 1929 to December 31, 1930, as being an example of the work of a modern tramp tanker and the facility and efficiency with which the well-equiped ship of this type can perform her duties. Between the two dates mentioned, the ship has spent just over 360 days at sea, or 80 percent of the total time of the period under review. During this time the stoppages at sea totalled only 11½ hours due to broken bolts in one of the main propelling engines as well as to a slight disarrangement in the fuel valves because of fuel impurities.

The performance of the TURICUM is not put forward as anything in the nature of a special record because numbers of tankers of similar type are daily and yearly putting up equally good records, but it is not always that details are available for comment. The ship in the period under review left Curacao on October 5, and proceeded to Copenhagen, thence to Fredericia in Denmark; then via Gothenburg and Falmouth to Houston, Texas. Her next trans-ocean trip was the 5681 mile run from Houston to Rotterdam, returning, via Thameshaven, across the Atlantic to San Pedro, proceeding back to Thameshaven, and from Thameshaven to Beaumont, Texas. From Beaumont the next run was to Port Said, thence by the Suez Canal and Colombo to Calcutta. From Calcutta the TURICUM went to Singapore and thence to Melbourne, returning from Melbourne to Salik Papan and thence to Singapore, from Singapore to Liverpool, and from Liverpool to Belfast. The last outward voyage with which we are concerned in this particular log was from Southampton to Singapore, a distance of 11,897 miles. From Singapore the ship then proceeded to Sydney. Ships of this type designed for purely tramp work are naturally subject to the vagaries of the charter market and this today, as is well known, is anything but satisfactory.

Charter Market

SINCE these notes were last written there is very little further to report, although there has been slight enquiry for the carriage of clean oils, one or two vessels having been fixed at extremely low levels and one or two fixtures have been included for Black Sea—H. K. Continent the rate for freight remaining very low. In early August, the majority of the fixtures for clean oil were for motorships at prices varying from 9/2d. from Gulf to Dunkirk and Rouen to Russian Black Sea—U. K. Continent ports at 7/-. An interesting fixture for September loading for refined petroleum and/or benzine was the 9,000 tonner ATHELFOAM of the United Molasses Co., a company which has recently engaged in very extensive construction and whose tonnage whilst specially designed for molasses carrying has frequently come on to the open market for charter purposes. For September loading for dark oils, the motorship AASE MAERSK, a 7,500 tonner took 6/9d. Constanza-U.K. ports. The tanker

Tankers Recently Launched and Completed

Name	Owner	Builder	Type of Engine	Tonnage	Power	Speed Knots	Remarks
STANDARD XIV	American Petroleum Co. Antwerp	Chantiers Navals Vulcain, Antwerp	1 4-cyl. Deutz Diesel	381	154 hp.	8-9	Launched
DANMARK	Dampskibs Aktie 'Myrne' Copenhagen	Burmeister & Wain Copenhagen	2 Burmeister & Wain Diesels	16,000 Dw.	5000 hp.	13	Launched
MURENA	Royal Shell Group London	Burgerhouts Eng. & Sb. Co. Rotterdam	2 Burgerhout-Werkspoor Diesels	11,600 Dw.	4000 hp.	13	Launched
MANVANTARA	Royal Shell Group London	Netherland Sb. Co. Amsterdam	2 Werkspoor Diesels	16,600 Disp.	4000 hp.	12½	Launched
FUJISAN MARU	Ino Shoji Kaisha	Harima Dockyard Harima	1 M.A.N. Diesel	12,000 Dw.	7200 hp.	11½	Trial trip
CAMPAS	Cia. Arrendataria del Monopolio des Petroles	Echevarrieta y Larrinaga	2 Burmeister & Wain Diesels	.....	3100 hp.	11½	Launched
SLEMDAL	Ragnar Moltzau	Odense Steel Shipyard Odense	2 Burmeister & Wain	10,700 Dw.	3900 hp.	11.82	Trial trip

KATENDRECHT, a 6,700 tonner which it will be remember is interesting on account of her special arrangement of superstructure whereby both the bridge and the poop houses are streamlined, took 9/- for Gulf to Rouen, September/October loading.

Time charter remains practically devoid of enquiry. This is unfortunate because it means that the placing of contracts for new tramp tonnage will be retarded until there is more definite enquiry available. The only consolation the tramp tanker owners can have as a result of this present depressed state of affairs in the charter market is that shipbuilders normally engaged in the production of a standard tanker which they can sell on deferred payment terms, are now putting their brains in steep for the production of a much better and more efficient unit as soon as conditions improve. New units have got to take into account the effect of the new freeboard regulations which it will be remembered, was mentioned in these notes recently are being anticipated by the Norwegian tanker owners under a special decree which allows them to load to the freeboard permissible under the new regulations. As far as American coasting is concerned, the market remains quiet and figures quoted towards the end of August for dark oils were at 14c. per barrel from Gulf to Northern States.

New Orders

As far as contracts for new tankers are concerned, the market remains absolutely quiet and no new orders have been placed, the only orders with which shipbuilders are consoling themselves at the moment being for repairs and reconstructions on existing ships. The contract for repairing the motor tanker WELLFIELD, owned by Hunting & Son of Newcastle, which was commented on in these columns some months ago, has been let to Smiths Dock Co., Ltd., of North Shields; but the contract for engine repairs will be carried out by the North Eastern Marine Engineering Co. who built the original machinery. The engines will be lifted out of the hull for overhaul, and the ship is to be lengthened 25 ft. by the addition of a new tank in the center of the ship. Another contract which has recently been placed is that with Aitchison & Blair, Stockton-on-Tees, who have contracted to build a set of triple-expansion engines to replace the Diesel machinery in an oil tanker.

Panama and Suez Oil Shipping

LATEST returns of the Panama Canal show that during the month of June, 1931, 49 tankers transited the Canal with an aggregate net tonnage (Panama Canal measurement) of 282,-563 tons. In point of net tonnge tanker traffic decreased 35.3 percent in comparison with tanker traffic for the corresponding month a year ago. Tankships comprised 12.3 percent of the total commercial transits through the Canal during the month. These are the lowest proportions of any month for tanker traffic since the beginning of large shipments from the California field.

It is interesting to contrast these figures with figures for the Suez Canal for the first six months of the year, although it should be realized, of course, that the Panama figures are for one month whereas those for Suez are for six months. Tank vessels in ballast passing the Canal amounted to 1,278,000 tons net, 30,000 tons less than that for the same period of last year. Russia exported during this period 128,000 tons of petrol, and is stated to be the only nation which shipped more goods beyond Suez in this period than in the first six months of 1930. For northbound transits in tons the principal shipments were motor fuel 678,000, against 859,000 for the same period last year, unrefined petroleum 664,000 as against 745,000, fuel oil 398,000 as against 285,000, other petroleum products 168,000 as against 153,000.

A. C. HARDY.

Economic Law In Petroleum Industry

(*Continued from page* 584)

We have remarked on other occasions that artificial interference with the orderly working out of economic law is a dangerous experiment. And certainly events of the past two years have tended to confirm this statement. Yet there is nothing inherently unsound in such efforts, if undertaken with skill and wisdom and conducted with due regard to immutable fundamentals. Any artificial action that will do in a short time what economic laws will do in a long time is sound. The hazard lies not in the absence of knowledge as to how, for example, production can be scheduled and controlled, but in the pervasive presence of the human elements of ignorance and cupidity that set the efforts of reason at naught.

In conclusion reference may be made to a statement of the Committee on Petroleum Economics in its report to the Federal Oil Conservation Board on November 6, 1930, as follows:

> "It perhaps should be stated that curtailment of current supply . . . should not be expected to provide a cure for the fundamental economic maladjustments existing in the petroleum industry, which arise from the fact that this activity is overdeveloped, overcapitalized, and rests upon an unsound method of competitive offset drilling. Curtailment of production alone cannot remedy these conditions; to reach the root of the difficulty will require restriction of drilling, abridgement of plant expansion, and a modernization of the prevailing method of crude oil production to place this department of the business in lowcost brackets and on a competitive basis with the rest of the world."

This one paragraph is very important, and explains why prices have continued to go down in spite of curtailment.

[M. Pogue's paper was delivered at Atlantic City, September 17, 1931.]

FINANCE

London—September

WORLD PETROLEUM learns that Sir Henri W. A. Deterding maintains the opinion that in the present gold crisis in Great Britain, oil—the ideal source of energy—wil remain of the highest value, even if gold should cease to have any value; that after the present crisis has passed the Royal Dutch-Shell group will emerge stronger than ever, stressing the fact that Shell companies have tens of millions of pounds sterling available. Sir Henri has repeatedly expressed the belief that the establishment of silver as a medium of international exchange would result in an immediate start toward business recovery and a rapid improvement in international trade.

FOLLOWING the establishment of new low records for leading oil shares there was a big recovery after the suspension of the gold standard in Great Britain. Prior to this the market had to absorb a continuous stream of sales of small lots, evidently the holdings of investors discouraged by the protracted fall in prices. Although the London Stock Exchange was closed on the Monday and Tuesday following the suspension of the gold standard, unofficial street prices were well above Saturday's low levels. There has been almost consistent further improvement; but with temporary reactions since the exchange reopened on Wednesday. Incidently, a considerable short interest for French account was disclosed. In covering, the Continental and London bears started the recovery, and much public buying came along.

Anglo-Persian and other major refining and marketing companies will derive benefits from any rise in product prices; but companies with overseas distributing facilities have a prospective advantage from the low Sterling exchange rate. With Sterling depreciated there is little fear of Continental selling, which previously caused weakness. The rise coincided with a simultaneous movement of all equity shares, and assisted in increasing confidence in the soundness of the finance of leading companies. Contributory factors were Sir Henri Deterding's latest reassuring statements.

Prices compared with closing figures the previous weekend were—Anglo-Persian 1:29/32 against 1:3/8; Burmah 2:1/16 against 1:11/16; Royal Dutch 16:1/4 against 9:3/4; Shell 2:3/16 as compared with 1:1/2. There was a slight reaction on Friday, September 25, but the undertone was strong.

The increase of 2d. per gallon in the petrol duty, included in Mr. Snowden's budget-balancing scheme, had recently been an adverse factor, and the only previous bull point had been the sharp decline in United States production at the end of August, and the concurrent rise in the price of mid-Continent crude.

Heavy depreciation in the values of shares included in the Royal Dutch-Shell group prior to the suspension of the gold standard had been one of the outstanding features. This is attributed to the after effect of the passing of the dividend on Shell Union Oil Corporation preferred stock, and the inferences drawn therefrom as to the profit earning capacity of the group. Royal Dutch, the senior partner in the combine, lost one-quarter of its market capitalization during the past month, by declining from 16¼ to 12¼ before the latest rise. Shells came down almost as heavily, and such shares as Anglo-Egyptian "B", and V.O.C., shares show severe falls.

It is asserted that no inside selling has been taking place, and the relapse in the quotation is attributed to bear operations. If the amount of selling from Amsterdam to London actually represents the creation of the interested "short" interest, the market must have acquired great technical strength. The recent weakness of Royal Dutch and Shell shares in London induced some speculation as to the likelihood of payment of interim dividends by the two companies this year. As the half-yearly announcements are not due until November, the market is likely to be left in suspense for some weeks.

SHAREHOLDERS in the London and Thames Haven Oil Wharves have been disappointed in the bonus proposals of the directors, although the scheme itself was attractive enough. Some time ago the chairman indicated that further capital would be needed for extensions in connection with the company's French subsidiary, and for developments in this country. Authority has now been given for the creation of 500,000 new ordinary £1 shares, increasing the total capital to £1,500,000, and new shares are being offered to existing shareholders at £2. 10s. each. Shareholders are entitled to apply for one new share for every four shares held, with the possibility of obtaining further additions to their holding if they so desire. As the

London Stock Exchange Prices

1931 High	1931 Low	Last Year's Div.% per Ann.	Share	August 15 to September 15 First	High	Low	Last	Change
9/16	1/4	3½	Anglo-Ecuadorian	5/16	11/32	1/4	1/4	— 1/16
2 3/16	1 3/32	17½	Anglo-Egyptian "B"	1 5/16	1 3/16	1 3/32	1 9/32	— 7/32
2 19/32	1 13/32	15	Anglo-Persian	1 3/16	1 23/32	1 7/16	1 1/2	— 1/8
5/8	9/32	25	Apex Trinidad (5s.)	11/32	3/8	5/16	3/8	+ 1/32
31/32	1/2	....	Attock	3/4	3/4	9/16	5/8	— 1/4
5/16	5/32	5*	Brit. Borneo (6s.)	3/16	3/16	5/32	5/32	— 1/32
7/32	5/32	6¾	Brit. Burmah (8s.)	3/16	3/16	5/32	3/16	.....
5/32	1/16	....	Brit. Controlled ($5)	1/16	3/32	1/16	1/16	.....
1/4	1/16	....	Brit. Controlled Pfd. ($5)	3/32	1/8	3/32	3/32	.....
3 5/8	1 27/32	22½	Burmah	2 3/16	2 3/16	1 27/32	1 7/8	— 5/16
15/32	1/4	12c.	Canadian Eagle (No par)	5/16	11/32	1/4	9/32	— 1/32
11/16	5/8	....	Creole (No par)	7/16	5/8	7/16	7/16	.....
5/32	1/16	....	Kern River (10s.)	3/32	3/16	1/16	1/16	— 1/32
1 1/8	11/16	10	Lobitos	27/32	15/16	11/16	3/4	— 3/32
17/32	5/16	6	Mexican Eagle ($4 Mex.)	11/32	3/8	5/16	5/16	— 1/32
36 1/8	24¾	40c.	Pan American "B" ($50)	26	30½	26	26	.....
3/8	3/16	2½	Phoenix	3/16	7/32	3/16	3/16	.....
26 5/16	11 7/8	17	Royal Dutch (fl. 100)	16¼	16 13/16	11¾	12¼	— 4
3 27/32	1 21/32	17½*	Shell Transport	2 3/16	2¼	1 21/32	1¾	— 7/16
9/32	5/32	4	Steaua Romana	7/32	1/4	7/32	7/32	.....
1 15/32	1/2	7½	Trinidad Leasehold	15/16	1	23/32	3/4	— 3/16
9/32	5/32	....	Untd. Brit. of Trinidad (6s.8d.	5/32	5/32	5/32	5/32	.....
1 23/32	15/16	17½	Venezuelan Oil Concessions	1 3/32	1¼	15/16	15/16	— 7/32

Nominal value of shares £1 unless stated by bracketed figures. * Denotes Tax-free dividend. c. Denotes cent per share.

price of the old shares was 3½ at the beginning of September, the scheme offered the prospect of a moderate bonus; but the general weakness of markets, and the difficulty which some shareholders evidently saw in taking up new shares at the present time, has since brought down the quotation to about 2 13/16. At this level for the old shares, the right to apply for one new for four old is only valued at about 1s. 6d., and is therefore hardly worth having.

ALEC. H. DAY.

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New York, September

DURING the month of September the stock and bond markets were subject to renewed weakness, with persistent liquidation forcing the list as a whole well below the previous bear market lows of June 2. The financial crisis in England involving temporary suspension of gold payments, and at home the failure of appearance of the anticipated seasonal improvement in basic industries, notably steel, seemed to be the dominant factors. Oil shares proved no exception to the general character of the market, and after having given a good account of themselves during most of August plunged downward to approximate their previous lows.

FOLLOWING an initial dividend of 40 cents a share paid July 20, Pan American Petroleum and Transport has declared another 40-cent payment to be made October 20. Mexican Petroleum Corporation, a subsidiary, declared the regular quarterly dividend on its $8 preferred stock, payable October 20. The common dividend, which had been at a $12 annual rate, was omitted earlier this year. Readers will recall that Pan American was the only major oil company to show higher earnings for 1930 than for 1929.

Consolidated net profit for the first half of 1931 after all charges and inventory adjustments, but before Federal taxes, was $4,031,051, compared with $7,988,361 earned in the first half of 1930. Mexican Petroleum showed a net loss for this period of $1,406,689, against 1930 half-year profit of $2,737,936.

IT is reported that the Independent Petroleum Association of California has sent a letter to the United States Department of Justice protesting against the contemplated merger of Standard Oil Company (New Jersey) and Standard Oil Company of California. It is apparent, however, that the apprehensions of this group are not shared by the majority of the independents on the West Coast, since the Oil Producers' Sales Agency, the largest independent oil association in California, has said in commenting upon the above letter of protest that they would regard such a consolidation as tending to promote stabilization in the industry, and as an aid to American interests in maintaining their competitive position abroad.

CITIES SERVICE COMPANY reported gross earnings for the 12 months ended August 31 of $43,700,152, a decline of 26 percent from the previous 12 months period. Net earnings available for stocks and reserves were $28,955,247, a decline of 41 percent. Although the corresponding gross and net figures for the month of August were off 50 percent and 65 percent respectively from August, 1930, some slight encouragement may be gleaned from the fact that August showed some improvement over both July and June of this year.

TIDE WATER OIL and Associated Oil, have both omitted their common dividends due at this time. The parent company passed its common dividend in August; but has continued payments on its $6 preferred. The holding company receives practically all of its revenues as dividends on its holdings of the common stocks of these two subsidiaries, and these dividend omissions might seem to foreshadow omission of payments on its preferred.

CASH dividend payments of the Standard Oil group of companies for the third quarter total $51,263,888, a decline of 11 percent from the second quarter and of 25 percent from the third quarter of last year, according to figures compiled by Carl H. Pforzheimer and Company. Action of Prairie Pipe Line is not included, since their August directors' meeting was postponed for lack of a quorum. If Prairie pays the regular 75-cent dividend the total will be increased by just over $3,000,000. The third quarter reflects the halving of the Standard of Indiana rate from $2 to $1 annually, and the initial 40-cent quarterly payment on Socony-Vacuum which is equivalent to increasing the old Vacuum rate from $2 to $4 per annum.

READERS will note that this month's table omits Standard Oil of New York and Vacuum and adds the new Socony-Vacuum stock. Although there are probably small amounts of the constituent companies' shares still outstanding, participation in the merger will be practically complete and Standard of N. Y. and Vacuum have been dropped from listing on the New York Stock Exchange and New York Curb Exchange.

New York Stock Prices

1931 High	1931 Low	Current Div. $ per Annum	Stock (Par Value $)	August 17 to September 19 Sales (Shares)	First	High	Low	Last	Net Change
23⅜	11⅛	1.00	Atlantic Refining (25)	75,600	16¾	18⅛	12¾	12¾	— 4⅛
14⅛	5¾	....	Barnsdall "A" (25)	87,100	8⅛	9¾	6⅜	6⅞	— 1⅜
3⅛	¾	....	Colon Oil (No)	11,600	1⅝	1⅞	1	1	— ⅛
12	5	....	Continental Oil (No)	184,400	9¾	11¼	6	6¾	— 2¾
3⅞	2	....	Creole Petroleum (No)	29,100	2⅜	3⅛	2⅛	2⅛	— ¼
75½	38	1.50	Gulf Oil Corp. (25)	35,100	64	69⅜	43⅛	44	—18½
72	49⅞	2.00	Humble Oil & Ref. (25)	8,400	65	71	50½	50⅜	—14⅝
18¼	9⅞	0.50	Imperial Oil, Ltd. (No)	26,100	13½	14⅜	10½	10½	— 3
4⅝	2	....	Indian Refining (10)	13,600	2⅜	3¼	2⅛	2⅛	+ ¼
15½	8¾	1.00	International Petr. (No)	85,400	13	14⅛	9¾	9¾	— 3⅛
19½	7	....	Ohio Oil (No)	115,200	10⅜	13¾	7½	7¾	— 3
36½	24	*0.80	Pan Amer. P. & T. "B"(50)	2,300	30	30	30	30	+ 1
16⅝	4⅜	....	Philips Petr. (No)	161,000	9½	10¼	5¾	6	— 3
20⅜	6½	....	Prairie Oil & Gas (25)	35,300	11½	15½	8	8¼	— 3½
11⅞	5½	....	Pure Oil (25)	61,500	8½	9⅞	6	6½	— 2¼
6⅜	1	....	Richfield Oil (No)	8,900	1⅞	1⅞	1⅜	1⅜	— ⅝
42⅜	14	†2.27	Royal Dutch N. Y. (13⅓)	36,200	26½	27⅛	14	14	—13⅝
20¾	9⅞	....	Seaboard Oil (No)	148,400	15⅛	16	9⅞	10	— 5⅛
10¼	4⅛	....	Shell Union (No)	86,200	6¼	6⅞	4⅛	4⅛	— 2⅜
15⅞	6¼	....	Sinclair Consol. (No.)	359,300	11¼	12¾	7¼	7¼	— 3⅞
12⅞	3⅛	....	Skelly Oil (25)	12,500	7½	8⅛	4⅜	4⅜	— 3
21	14⅞	1.60	Socony-Vacuum (25)	248,500	19⅝	21	14⅞	15	— 4½
51¾	31⅛	‡2.50	Standard Oil of Calif. (No)	167,900	39	42	33¼	33¼	— 5¾
38½	19⅛	1.00	Standard Oil, Ind. (25)	119,900	26⅞	27⅜	21⅞	21⅞	— 4⅝
23⅝	15⅝	1.60	Standard Oil, Ky. (10)	20,800	19⅜	21¼	16⅜	16⅜	— 3¼
52½	30⅝	§2.00	Standard Oil, N.J. (25)	368,200	40⅜	42½	33⅛	33⅛	— 7⅜
45¼	30	#1.00	Sun Oil (No)	6,900	38¾	39⅞	30	30	— 8
36¼	18	2.00	Texas Corp. (25)	197,900	24⅞	28⅛	19¾	20	— 4⅞
9	4	....	Tide Water Assoc. (No)	190,300	7⅛	9	4⅛	4⅛	— 3⅛
26⅜	14	*2.00	Union Oil of Calif. (25)	62,600	17½	19½	14	14¼	— 2¾
1⅞	⅜	....	Venezuelan Petr. (5)	6,400	¾	1	½	¾	.....

' Since close of last month's table. * Amount paid so far this year—no regular rate specified. † Paid for 1930—no regular rate. ‡ Also paid 2 percent on stock at close of 1930. § Including extras. # Also paid 9 percent in stock at close of 1930. * Plus 4 percent in stock.

DUE largely to economies in operations Phillips Petroleum was able to report a consolidated net profit for August of $420,308 after depreciation, depletion and other reserve charges. Appreciation in inventories, which was quite substantial during the month, is excluded, as is a special nonrecurring profit of $1,172,515 from sale of gas rights. Bank loans have been reduced this year by $4,500,000, thus improving the financial position, which at the close of the half-year was not too strong.

GULF REFINING COMPANY, subsidiary of Gulf Oil, plans expenditure of about $1,000,000 on additions to its refinery at Toledo, Ohio. The program includes a new still, additional storage tanks, and a marine service station on the Maumee River with pipe line connections to the refinery to enable delivery of oils and gasolines direct to Great Lakes vessels.

UNFAVORABLE conditions in the industry, including low prices and the restriction of production were responsible largely for the relatively poor earnings in the first half of 1930, of the Sinclair Consolidated Oil Corporation. The net loss was $10,415,088 after all expenses and charges, including reserves of $11,514,181 for depreciation, depletion and amortization. This contrasts with a net income of $3,215,709 after similar charges and reserves in the same period of 1930, equal after preferred dividends to 49 cents a share on the 5,420,080 common shares then outstanding.

Gross operating earnings, exclusive of inter-company sales and inter-company transportation charges, amounted to $66,597,798 in the first six months of 1931, against $88,423,056 in the same period last year. Costs, operating and general expenses declined from $72,492,569 in the 1930 period to $63,746,177 the first half of 1931. Non-operating income was slightly higher, amounting to $696,084 in the first six months of this year, against $616,765 in the 1930 period. Depreciation, depletion and amortization amounted to $10,195,447 in the first half of 1930.

AS one of the steps preparatory to the huge Sinclair merger (see last month's notes), it is thought probable that that company will call for retirement some time this year its present outstanding 8 percent cumulative preferred. At its call price of $110 a share, its redemption would require about $15,500,000. Annual interest requirements on this issue represent about 7.3 percent on the funds needed for its retirements, a yield which the management is hardly able to secure upon its present large cash resources. At the close of 1930 cash alone amounted to $35,795,000.

SIMMS PETROLEUM COMPANY plans to buy its new $10 par value stock at $6 per share up to 100,000 shares. The plan is expected to be ratified by stock holders on October 15. As of August 15, 1931, the book value was over $15 per share, and net current assets, valuable oil inventories at market, were in excess of $4 per share. Since June 1,500 shares have been purchased at $6, and 68,890 shares are now held in the treasury. Cash on hand is more than $1,200,000.

G. C. BAILEY.

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Paris—September

BUSINESS concluded upon the French oil share market has not been important during the past month and all stocks offered attained another low water mark. Even the news of reduced American production and the increase prices of crude oil did nothing to hearten the market until Great Britain temporarily abandoned the gold standard when there was an increased activity in oil stocks. There were many active cash bargains with the leaders in good demand, proving the firm tone of the French market now existing at the time of writing.

Owing to the small volume of money in circulation and to the ever increasing losses sustained by oil distributing companies in France, plans for construction of projected refineries seem to be hanging fire. The general impression is that all concerned are holding their hands, and seem unable to bring themselves to a definite decision to spend the vast sums which the construction would entail.

RAFFINERIE DE PETROLE DU NORD is one of the few distributing companies reporting profits for the financial year ending on March 31, 1931. They are not large, it is true, and no dividend is to be paid; but results are nevertheless fairly satisfactory.

In the first place the company announces an increase in sales, over those of 1930, of 38 percent for gasoline and petroleum products and 60 percent for heavy oils. That is to say, the R. de P. du N. has distributed 825,000 bbl. of products, which is the total quantity it was authorized to import under the "refined products license." This total has been increased by 10 percent for the year 1931-32.

The company's gross profits figure out at Fr. 57,797,393 this year, against Fr. 45,829,044 for the same 1930 period. Overhead and working expenses amounted to Fr. 51,636,862 against Fr. 41,140,924, and net profits came to Fr. 6,160,530 as compared with Fr. 4,688,120 in 1930.

The Raffinerie de Petrole du Nord has been enabled to reduce its distributing expenses by 10 percent, owing to improved commercial organization and increased sales. Having decided not to pay any dividends this year, the board of directors proposes putting aside Fr. 50,000 for amortization of preliminary expenses (it is the habit in France never

Paris Bourse Prices

1931			August 13th to September 14th 1931				Position on September 1930	
Div.	Par	Share	First	High	Low	Last	Change	
30 Lei	500 Lei	Astra Romana	80	90	69	69	—11	154
....	500 Lei	Colombia	68	70	52	52	—16	117
30 Lei	500 Lei	Concordia	54	58	45	45	—9	110
....	500 Fr.	Cdré. Gén des Pétroles act	....	....	....	....	....	....
....	500 Fr.	Cdré. Gén. des Pétroles part.	880	880	700	700	—180	7850
....	500 Fr.	Franco Pol. Pétroles act	56	58	50	50	—6	106
....	....	Franco Pol. des Pétroles part	....	....	....	....	....	....
1 $	10 $	Franco Wyoming	233	245	208	208	—25	460
20 Fr.	500 Fr.	S.G.des Huiles de Pétrole act	298	298	220	220	—78	558
....	....	" " part	93	95	91	91	—2	251
....	500 Fr.	C. Française des Pétroles	....	....	....	....	....	....
....	500 Fr.	C. Industrielle des Pétroles	805	810	785	785	—20	1000
70 Fr.	500 Fr.	Lille Bonnières Colombes prio	806	810	695	695	—111	1195
45 Fr.	500 Fr.	" " ord	512	512	460	460	—52	755
....	500 Fr.	Malopolska act	26	26	17	17	—9	200
....	....	Malopolska part	....	148	130	....	....	2160
....	....	Mexican Eagle	47	47	43	....	....	....
....	250 Fr.	Omnium Inter. des Pétroles	101	102	90	90	—11	159
50 Fr.	500 Fr.	Pechelbronn	600	600	495	495	—105	900
60 Fr. B.	500 Fr. B.	Petrofina	455	486	415	415	—40	575
240 Fl.	1000 Fl.	Royal Dutch	20200	20400	15000	15000	—5200	37575
24 Fl.	100 Fl.	Royal Dutch 1/10	2060	2085	1520	1520	—540	37550
....	1 £	Shell	285	285	219	219	—66	550
25 Fr.	500 Fr.	Steaua Française	209	209	148	148	—61	202

to write these off after a company's first financial year, but to divide them up over a given period), and to pay Fr. 6,110.537 towards the amortizement of the asset account. This proposition was unanimously accepted by shareholders.

IT is said that the board of directors of the S. A. Lille Bonnieres et Colombes will propose a dividend of Fr. 45 for preference shares and of Fr. 20 for ordinary shares, at the annual meting to be held on September 23.

Net profits for 1930-31 are considerably less than those of 1929-30, having in fact been halved and stand at Fr. 2,337,295 as compared with Fr. 5,084,-559. Stocks of products also have decreased in value owing to falling prices, and when inventories were taken in March were worth only Fr. 51,515,101 against Fr. 66,987,190 the previous year. Since that date they have further depreciated. The necessity of keeping three months supply in stock is proving a very great strain upon the distributing companies in this country.

NO half yearly dividend was paid by the S.A. Franco-Wyoming on September 10, the reason given being the present world crisis and falling prices of petroleum products. There was a slight fluctuation in quotations of the company's shares as a result; but they have recovered their positions since and now stand at Fr. 208.

PETROLES JUPITER, representing the Shell interests in France, has recently increased its capital from Fr. 390,000,-000 to Fr. 525,000,000 by the issue at par of 20,000 B. shares of Fr. 5,000 each, and by effecting a special reserve of Fr. 35,000,000 for the issuance of 7,000 B shares of Fr. 5,000 each.

A GENERAL MEETING of the shareholders of the Compagnie Francaise des Petroles was to have been held in Paris on September 16. Due to the absence of a quorum this meeting was postponed until September 30. Two matters were approved by the shareholders at this meeting: namely, the ratification of the Agreements of May 17, 1924, June 25, 1930, March 4, 1931, between the French State and the company, and an increase of Fr. 50,000,000 in the capital.

THE S.A. "Petroles France-Mexique" announces a deficit of Fr. 1,106,996 for the last financial year, which coupled with those of the previous years makes a total of Fr. 9,115,336,76.- Every pretext has been made use of in explaining this loss—the falling prices of petroleum products, the extremely onerous conditions brought about in Mexico by recent economical and political changes, as well as the depressed state of the oil industry there, for the S. France Mexique, through the intermediary of its affiliated company the Cia Petrolera Francia-Mexico has concessions covering about 4,000 hectares of oil bearing land.

These explanations do not, however, constitute all the facts. The Société Dabrowa took over the original company from a German group in 1926. Since then, the French company, unable to swim against the current of bad times, has been completely submerged, with the result that unless conditions improve in Mexico, and more especially in the Panuco Field, the S.A. France-Mexique's losses will total almost three-quarters of the subscribed capital. This is partly due to the fact that all the plants, drilling equipment, tanks, pumping stations, etc. have depreciated in value.

E. J. ANDRE.

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International News and Reports

OF the 15 cents tax and primage on motor fuel in Australia only five cents goes to road maintenance.

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Storage of oil—mostly refined—at Avonmouth, Bristol, has grown to the point where it is the second largest in Great Britain. In 13 years the tank capacity has increased over 3,000,000 bbl.

Because the Standard Oil Company (Indiana) through its subsidiary Petroleum Storage and Distributing Company, continues to sell motor fuel in Great Britain at 22 to 24 cents per Imperial gallon, or four cents below the other major companies, a price war is forecast by part of the British daily press. Apparently this four cent differential is to offset the "loyalty discount" granted to service stations that carry only the so-called "combine" brands. Because of the low-cost refining at Aruba, D.W.I., the Indiana Standard is to an extent favored in its operations.

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Total recorded gasoline sales in New York State for July 1931 set a new high record, being 169,276,993 U. S. gal., or 4,030,407 bbl. of which 4,110,441 gal. were tax free. Tax paid sales were 165,-166,531 gal. (3,932,536 bbl.) on which refunds were allowed on 5,051,479 gal. For the first seven months of 1931 total tax paid sales amounted to 876,165,353 gal. (20,863,368 bbl.), and refunds were allowed on 20,408,036 gal. The State tax is two cents per gallon.

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Premier J. E. Brownlee, of Alberta, announced on September 5 that the merging of twenty-seven independant oil and gas producing companies with fourteen other companies directly and indirectly controlled by Imperial Oil, Ltd., had been endorsed by a majority of the companies concerned. The companies involved will pool and distribute gas to the gas company of the city of Calgary. This movement, if consummated, is a definite step towrad the conservation of the Turner Valley field, which has been a matter under investigation by both the Dominion Government, and the Provincial Government of Alberta for some years.

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New petroleum explorations are to be carried on in Tunis territory by an organization to which the Government of the Protectorate and the Paris Office of the National des Combustibles Liquides will both subscribe Fr. 2,000,000. Although the New Jersey Standard, the Carthage Oil Syndicate, the Cie. Recherches et Forages, and the Tunisian Government have all drilled without finding oil in commercial quantities, it is the belief of Charles Baron, president of the French Government's Mining Commission, that the presence of an enormous bed of phosphates is a sure indication of petroleum.

▼

Curacao, where the world's largest refinery is located, imported 465,624 bbl. gasoline, including 396,461 bbl. from the United States, during the first five months of 1931. Presumably this gasoline was imported for blending purposes at the new Bullen Bay blending plant. During the same period, the refinery imported 21,633,012 bbl. of crude oil from Venezuela.

Experience of Forty Engineers

Results of the experience of forty outstanding engineers dealing with as many important aspects of production and refinery technology is made available to the petroleum industry in the second edition of the Petroleum Engineering Handbook. Each chapter is devoted to a subject of major importance to the technical branch of the industry and is written by a man who was selected for his recognized experience and ability in the field which he treats in the Handbook.

The charts and tables of the second edition are even more complete than those included in the first edition and furnish a valuable reference book with solutions applicable to actual current problems in the industry. These charts and tables are readily available to users of the book by means of a complete cross index.

The Petroleum Engineering Handbook is strictly technical, written by technical experts for practical engineers. In every case theory and history have been sacrificed to specific data, facts, figures, and actual field experience.

Among other interesting papers dealing with various aspects of refining is a chapter on the Cracking Process by David E. Day, refinery engineer of the Richfield Oil Company. This consists of a complete review of commercial cracking processes using actual installations and flow charts for illustration, and a detailed report of the modification of processes for local conditions. Inherent advantages and disadvantages are summerized. Hydrogenation is well covered from both engineer's and economist's viewpoint. The modernization of cracking plant equipment is outlined, and continuous treating processes are diagrammed.

A problem of increased importance to the production branch of the industry is discussed by Dr. Frederick H. Lahee, chief geologist of the Sun Oil Company, in a chapter dealing with Straight Hole Drilling Methods. In this paper the distinguished author discusses how to start a hole vertically; types of bit and how to modify the lower bit stem for straight drilling; coring with full diameter bits; surveying the hole, and permissable deviations, how to straighten the off-vertical hole; practical operating economies of the straight hole. Through this writer, forty experienced operators tell you how they have trued up their drilling.

Transportation is covered by numerous papers on pipe lines, etc., one of which, written by Oscar Wolf, chief engineer, The Texas Pipe Line Company consists of a collection of formulae for application to the mathematics of pipe line design and pump application, entirely modern, complete, and so basic as to constitute a standard reference work on pipe line problems.

These are only a few of the interesting papers, selected at radom, to show the method used in covering various subjects in this 450 page standard reference work. A ten-page cross index makes all the material readily available.

Copies of the Petroleum Engineering Handbook may be obtained through World Petroleum at five dollars a copy, postpaid.

London Oil Market

September

The mineral oil market continues quiet. The only changes to record during the last month being a slight increase in the prices of Pennsylvania lubricating oils and the imposition of an additional tax of 2d per gal. on motor spirit as from September 10, in Great Britain. This, of course, had been expected, and therefore came as no surprise. The tax on motor spirit in England, Wales, Scotland and Northern Ireland is now 8d. (16 cents) per gal. As regards kerosene there is no definite tax on this at present; but in all probability a tax of 2d per gal. will be imposed on kerosene where used for blending with motor spirit.

Motor spirit: Wholesale prices, delivered in bulk, are as follows:

	Aviation	No. 1	No. 3
England and Wales and Scotland	1/7½	1/3½	1/1½
Belfast Zone	1/8	1/4	1/2
Rest of Northern Ireland	1/8½	1/4½	1/2½
North Scotland	1/8½	1/4½	1/2½
Dublin Zone	1/3½	11½	9½
Rest of Irish Free State	1/4½	1/- ½	10½

Wholesale prices in 2-gal. cans: Aviation and No. 1: 1d, and No. 3: 1½d per gal. above bulk prices except in Irish Free State and Northern Ireland where they are 2d per gal. more.

Gas oil: In rail tank car loads, i.e., 10 ton lots 3¼d per gal., and in smaller quantities of 1,000 gal. and upwards 3½d per gal., net and naked, ex wharf.

Lubricating oils: The following are the market quotations:— American pales £9/10/- to £21/-/-, American reds £10/7/6d to £15/10/-, American dark cylinders £9/17/6d to £22/-/- and American filtered cylinders £16/5/- to £27/5/- per ton, less 2½ percent, barrels free, ex wharf.

Fuel oils: Furnace fuel oil £3/7/6d per ton, in bulk, ex ocean installation, for inland consumption, for bunkers the price is the same, i.e., £3/7/6 per ton. Diesel fuel oil £4/-/- per ton, in bulk, ex ocean installation, for inland consumption, for bunkers the price is 2/6d per ton dearer, i.e., £4/2/6d per ton.

For contracts — furnace fuel oil £3/2/6d, and Diesel fuel oil £3/2/6d, and Diesel fuel oil £3/15/- per ton.

The foregoing information was supplied by Benjamin and Company of London.

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